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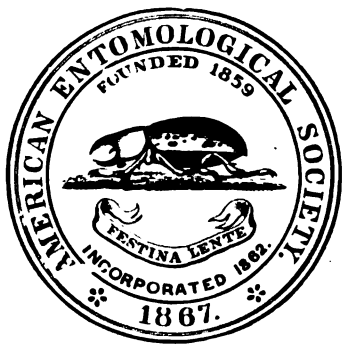

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TRANSACTIONS

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VOLUME XXIX.

A CONTRIBUTION TO THE KNOWLEDGE OF THE ORTHOPTERA OF MEXICO AND CENTRAL AMERICA.

BY JAMES A. G. REHN.

This paper contains the results of a study of 464 specimens, principally from the collection of the author (now presented to the Academy of Natural Sciences of Philadelphia), beside a small quantity of material in the collection of the Academy, and an interesting series of 118 specimens belonging to the United States National Museum, loaned through the kindness of Mr. W. H. Ashmead of that institution. The specimens from the United States National Museum are designated by the initials of that institution, while those from the author's collection are unmarked.

The original intention of the author was to make this paper a faunistic study, but many new species and records forced themselves into view, and the conclusion was reached that the present time is too premature for such studies in the region under consideration.

Family FORFICULIDÆ.

Psalis americana (Palisot de Beauvois).

1817, *Forficula americana* Palisot de Beauvois, Ins. Rec. en Afr. et en Ameriq., p. 165, Orth. tab. 14, fig. 1.

One ♂; Patuca, Honduras (U. S. N. M.)

Ancistrogaster spinax Dohrn.

1862, *Ancistrogaster spinax* Dohrn, Stettin Ent. Zeit., xxiii, p. 229, taf. 1, fig. 1.

Six specimens; four males, two females; Teocelo, Vera Cruz, Mexico. Collected by Otis W. Barrett (4). Jalapa, Vera Cruz, Mexico. Collected by Otis W. Barrett (2).

Ancistrogaster sp.

One immature ♀; Jalapa, Vera Cruz, Mexico. Collected by J. T. Mason (U. S. N. M.).

Neolobophora ruficeps (Burmeister).

1838, *F[orficula] ruficeps* Burmeister, Handb. der Ent., ii, p. 755.

Two males; Jalapa, Vera Cruz, Mexico Collected by J. T. Mason (U. S. N. M.).

These specimens are quite uniformly colored, the only apparent contrast being the reddish head. In one specimen the forceps are much shorter (7.75 mm.) than in the other (12.5 mm.).

Apterygida linearis (Eschscholtz).

1822, *Forficula linearis* Eschscholtz, Entomographien, i, p. 81.
—— *Forficula tæniata* Dohrn, Stettin Ent. Zeit., xxiii, p. 230.

Sixteen specimens; Jalapa, Vera Cruz, Mexico. August and September. Collected by Otis W. Barrett. (Eight; three males, five females.) Same locality. Collected by J. T. Mason. (Two; ♂ and ♀.) (U. S. N. M.) Texolo, Vera Cruz, Mexico. 1899. Collected by S. N. Rhoads (1 ♂). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (5 males).

Bormans and Krauss* have rather vaguely noticed that the name *linearis* of Eschscholtz was based on the same insect as Dohrn's *tæniata*, a fact which cannot be questioned when the original description of *linearis* is examined. All the characters assigned are perfectly recognizable, the size alone being somewhat unusual, though the writer has examined specimens but little larger.

Apterygida californica (Dohrn).

1865, *F[orficula] Californica* Dohrn, Stettin Ent. Zeit., xxvi, p. 85.

Two specimens, ♂ and ♀; Gualan, Guatemala. Collected by Mrs. S. P. McElroy (U. S. N. M.).

These specimens extend the range of the species south of the former southern limit—Teapa, Tabasco, Mexico.

Family BLATTIDÆ.

Pseudomops oblongatus (Linnæus).

1758, [*Blatta*] *oblongata* Linnæus, Syst. Nat., x ed., p. 425.

Four specimens; Orizaba, Vera Cruz, Mexico. January 9-16, 1892. Collected by H. Osborn (U. S. N. M.) (2). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (2).

* Das Tierreich, ii, Forficulidæ und Hemimeridæ, p. 110.

The specimens from Cuernavaca belong to the form which Saussure calls variety C (Miss. Scient. Mex., Orth., p. 50).*

Nyctibora noctivaga n. sp.

Type, ♂; Machuca, San Juan River, Nicaragua. Collected by Dr. J. F. Bransford (Acad. Nat. Sciences, Phila.) Allied to *N. mexicana* and *azteca*, but much larger than either. From *mexicana* it is distinguished by possessing an interspace between the eyes, and by having the pronotum somewhat produced anteriorly. From *azteca* it is distinguished principally by the very much greater size.

Size large. Head small, posteriorly produced; eyes almost contiguous; antennæ as long as the body, filiform, hirsute. Pronotum broad; anterior border somewhat produced, posterior border subtruncate; entire surface velvety. Tegmina extending much beyond the apex of the abdomen, apically rotundate, costal margin broadly rounded, surface velvety; marginal and discoidal fields longitudinally veined; anal sulcus arcuate, deeply indicated; anal field semiovate, subglabrous. Wings large, venation prominent. Limbs heavy; femora with the spines on the posterior margins much longer than those on the anterior margins; anterior femora bearing thirteen small spines on the anterior margin, basal section unarmed; tibiæ bearing prominent spines on all four margins. Abdomen heavy, the lateral margins of the four apical segments posteriorly produced. Supranal plate triangularly produced, apically emarginate, centrally ridged; subgenital plate large, apex subtruncate;† cerci heavy, acuminate, about twice as long as the supranal plate.

General color brownish black, shading on the more translucent portions of the tegmina to vinaceous, the "bloom" being a pale golden tint. Wings with the discoidal and anterior fields vinaceous; the intercalcate, intermediate and posterior fields transparent, the veins pale brownish. Abdomen with ferrugineous patches on the lateral portions of the segments. Supranal and subgenital plates brownish black, which general tint also colors the face, limbs and antennæ.

MEASUREMENTS:

Length of body	35 mm.
Length of pronotum	10 mm.
Greatest width of pronotum	14 mm.
Length of tegmina	38 mm.

Epilampra azteca Saussure.

1868, *Epilampra azteca* Saussure, Revue et Magas. de Zool. (2e ser.), xx, p. 356.

One female; Motzorongo, Vera Cruz, Mexico. February, 1892. Collected by H. Osborn. (U. S. N. M.)

Epilampra maya n. sp.

Type, ♂; Machuca, San Juan River, Nicaragua. Collected by Dr. J. F. Bransford (Acad. Nat. Sciences, Philadelphia).

* Characterized as follows: "Pronotum antice inter marginem anticum et fasciam mediam rufo, pone fasciam fusco; ano et coxis apice rufis."

† This plate is distorted at the apex and the true form is rather hard to ascertain.

This species is closely related to both *E. conspersa* and *azteca*, but is separated from each by very appreciable characters. The size is less than *E. conspersa*, the apex of the anal field is acute instead of obtuse as in that species, and the supranal and subgenital plates are both more acuminate. From *E. azteca* it is separated by the form of the supranal plate, which is produced and acuminate instead of rotundate or subtruncate.

Size rather small. Head distinctly visible in front of the pronotum when dorsally viewed, anterior outline well rounded; eyes large, considerably separated; antennæ filiform, sparsely pilose, over twice as long as the pronotum. Pronotum large, produced anteriorly, posterior margin triangularly produced, deflected lobes with the margins broadly rounded. Tegmina exceeding the apex of the abdomen, rather narrow, apex rounded, costal margin gently arcuate; anal sulci extended posteriorly, giving the anal field a semi-hastate form. Wings ample, extending to the tip of the tegmina when in repose. Femora sparsely spined; anterior pair bearing four spines on the central portion of the lower margin, three moderately large spines on the upper margin; median pair bear three centrally grouped spines on the lower margin, four on the upper; posterior pair with three spines on each margin, those on the lower margin centrally grouped, the last spine on the upper margin separated from the other two by a considerable interspace. Tibiæ heavily spined; basal tarsal joint set with fine spines, the general appearance being that of pectination. Supranal plate triangularly produced, margins somewhat reflexed, apex triangularly emarginate. Subgenital plate triangularly produced, scoop-like. Cerci slightly exceeding the supranal plate in length.

General color above tawny-olive.* Pronotum raw umber, very closely and minutely punctate with brownish black, the punctations being largest on the periphery. Tegmina regularly punctate with vandyke brown, the punctations largest in the anal field and in the distal half of the tegmina, which latter region contains several larger blotches of the same tint. Wings pellucid, the costal region slightly suffused with brownish and punctate with pale brownish. Both aspects of the abdomen blackish brown finely stippled on a brown-gray ground, the body tint being most noticeable below. Limbs horn, speckled with blackish brown; the overlying tint being strongest and more suffusing on the distal portions of the tibiæ.

MEASUREMENTS:

Length of body	21. mm.
Length of pronotum	5.5 mm.
Greatest width of pronotum	7.5 mm.
Length of tegmina	20. mm.

Periplaneta australasiæ (Fabricius).

1793, [*Blatta*] *australasiæ* Fabricius, Ent. Syst., ii, p. 7.

Two males; Minatitlan, Vera Cruz, Mexico. February 1, 1892.

* Ridgway's Nomenclature of Colors, pl. iii.

Collected by H. Osborn (U. S. N. M.). Teocelo, Vera Cruz, Mexico. Collected by Otis W. Barrett.

Periplaneta americana colorata Rehn.

1901, *Periplaneta americana colorata* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 220.

Four specimens; Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.). Minatitlan, Vera Cruz, Mexico. February 1, 1892. Collected by H. Osborn (U. S. N. M.). Honduras (U. S. N. M.). Yucatan. Collected by Schott (Acad. Nat. Sciences, Philadelphia).

Pycnoscelus surinamensis (Linnæus).

1758, [*Blatta*] *surinamensis* Linnæus, Syst. Nat., x ed., p. 424.

Two specimens; Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.). Yucatan. Collected by Schott (Acad. Nat. Sciences, Philadelphia).

Panchlora sp.

One specimen; Escondido River, fifty miles from Bluefields, Nicaragua. Collected by C. W. Richmond (U. S. N. M.).

This specimen has lost all the original color and, as is the case in this very difficult genus, cannot therefore be identified with certainty.

Zetobora maximiliani Saussure?

1868, *Zetobora maximiliani* Saussure, Revue et Magas. de Zool., 2e ser., xx, p. 457.

One immature specimen; Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.).

Homœogamia mexicana Burmeister.

1838, *Homœogamia mexicana* Burmeister, Handb. der Entom., ii, p. 490.

Three males and one female; Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (3). Uruapan, Michoacan, Mexico. 1899. Collected by S. N. Rhoads (♀).

Latindia mexicana Saussure.

1868, *Latindia mexicana* Saussure, Revue et Magas. de Zool., 2e ser., xx, p. 100.

One male; Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Latindia sp.

Two males; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

These damaged specimens will hardly agree with any of the described species, though possibly they are *L. tolteca* Saussure and Zehntner (Biol. Cent.-Amer., Orth., i, p. 113).

Blaberus* trapezoideus Burmeister.

1838, *Blabera trapezoidea* Burmeister, Handb. d. Ent., ii, p. 516.

Three specimens; Honduras and Central America (U. S. N. M.). Tekanto, Yucatan (Acad. Nat. Sciences, Philadelphia).

These specimens are somewhat doubtfully referred to this very variable species. One possesses no spines on the lower margin of the femora, which fact would place it in another section of the genus, but Saussure and Zehntner inform us that these are obsolete in some individuals. The maculation of the pronotum is very variable in form and intensity; in two specimens it is rounded posteriorly, entirely free from the posterior margin of the pronotum, and with the antero lateral angles much produced, the third specimen has the posterior margin of the pronotum forming the posterior boundary of the maculation.

Family MANTIDÆ.

Chœradodis rhombicollis (Latreille).

1833, *Mantis rhombicollis* Latreille, in Humboldt and Bonpland's Observat. de Zoolog., ii, p. 103; pl. xxxix, fig. 2 and 3.

One immature female; Machuca, Nicaragua. Collected by Dr. J. F. Bransford (Acad. Nat. Sciences, Philadelphia).

Stagmomantis tolteca (Saussure).

1861, *Mantis tolteca* Saussure, Revue et Magas. de Zool., 2e ser., xiii, p. 127.

One female; Machuca, Nicaragua. Collected by Dr. J. F. Bransford (Acad. Nat. Sciences, Philadelphia).

Stagmomantis limbata (Hahn).

"1836, *Mantis limbata* Hahn, Icones Orthopterorum, pl. A, gen. mantis, fig. 2."

One male; Yucatan. Collected by Schott (Acad. Nat. Sciences, Philadelphia).

Liturgousa cayennensis maya Saussure.

1894, *Liturgousa cayennensis* var. *maya* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 160.

One immature female; Uruapan, Michoacan, Mexico. April 11, 1899. Collected by S. N. and M. C. Rhoads.

* The original spelling is *Blaberus* Serville, Ann. Sci. Nat., xxii, p. 37.

Vates annectens Rehn.

1900, *Vates annectens* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 85.

Four males; Tacubaya, D. F., Mexico. October. Collected by Otis W. Barrett.

Family PHASMIDÆ.

Sermyle guatemalæ n. sp.

Type, ♀; Gualan, Guatemala. Mrs. S. P. McElroy (U. S. N. M.).

Apparently closest allied to *S. mexicana** Saussure, but differing in the spiniform interocular processes, and in the absence of any dorsal foliaceous lobe on the fifth abdomen segment. With the other species of the genus—*saussurii*, *azteca* and *strigata*—no comparison is necessary, the general characters of the head being shared by *mexicana* alone.

General build moderately robust, the entire body tuberculate, the tubercles most numerous anteriorly. Head with six longitudinal rows of tubercles, the median pair strongest developed, the second tubercle in each row being spiniform, several spines forming an additional group between the median rows; antennæ about half as long as the body, the basal joint considerably flattened. Prothorax about as long as broad, the collar slightly constricted; mesothorax elongate, over four times as long as the prothorax; metathorax considerably shorter than the mesothorax, heavy, showing traces of a median carination which also extends over the median segment and on the abdomen; median segment very short, over twice as broad as long. Abdomen moderately elongate, the tubercles arranged in four longitudinal rows on the dorsal surface, the lateral aspect with two longitudinal roughened carinæ; fifth segment somewhat inflated, no foliaceous lobe developed from the medio-dorsal portion of the segment, the lateral angles being posteriorly produced into rounded posteriorly projecting lobes. Femora and tibiæ multicarinate; anterior and posterior tibiæ slightly exceeding the femora in length.

General color vandyke brown, becoming walnut brown on the abdomen; limbs and antennæ raw umber.

MEASUREMENTS:

Length of body	80. mm.
Length of prothorax	4. mm.
Length of mesothorax	18. mm.
Length of metathorax	11.5 mm.
Length of abdomen†	43. mm.
Length of anterior femora	17. mm.
Length of median femora	11. mm.
Length of posterior femora	17.5 mm.

Libethra tridens (Burmeister).

1838, *B[acteria] tridens* Burmeister, Handb. d. Ent., ii, p. 567.

Three specimens; one male, two females; Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett.

* Revue et Magasin de Zoologie, 2e ser., xi, p. 62.

† Including the median segment.

Libethra sp.

One male (?). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

As this specimen has lost all of the abdomen except the four basal segments it cannot be identified with any certainty.

Bacunculus striatus (Burmeister).

1838, *B[acteria] striata* Burmeister, Handb. d. Ent., ii, p. 567.

One male; Jalapa, Vera Cruz, Mexico. August. Collected by Otis W. Barrett.

Aplopus sp.

One male; Panama (U. S. N. M.).

This specimen was at one time in a liquid preservative, and in consequence the coloration is gone and the specimen mummified in general.

Family ACRIDIDÆ.

Paratettix schochii Bolivar.

1887, *Paratettix schochii* Bolivar, Ann. Soc. Ent. Belg., xxxi, p. 274.

One male; Cuernavaca, Morelos, Mexico. June. Collected by Otis W. Barrett.

Paratettix toltecus (Saussure).

1861, *Tettix toltecus* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 401.

Nine specimens; six males, three females; Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.) (4). Minatitlan, Vera Cruz, Mexico. February 1, 1892. lelected by H. Osborn (U. S. N. M.) (1). Vera Cruz (city?), Mexico. January 26, 1892. Collected by H. Osborn (U. S. N. M.) (2). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (1). Cuernavaca, Morelos, Mexico. June. Collected by Otis W. Barrett (1).

Paratettix sinuatus Morse.

1900, *Paratettix sinuatus* Morse, Biol. Cent.-Amer., Orth., ii, p. 13.

One female; Uruapan, Michoacan, Mexico. March 12, 1899. Collected by S. N. and M. C. Rhoads.

Telmatettix aztecus (Saussure).

1861, *Tettix aztecus* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 400.

Five specimens; three males, two females; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (3). Teocelo, Vera Cruz, Mexico. September. Collected by

Otis W. Barrett (1). Cuernavaca, Morelos, Mexico. November. Collected by Otis W. Barrett (1).

Truxalis brevicornis (Johannson).

1763, *Gryllus brevicornis* Johannson, Amœn. Acad., vi, p. 398.

One female; Escondido River, fifty miles from Bluefields, Nicaragua. September 21, 1892. Collected by C. W. Richmond (U. S. N. M.).

Syrbula eslavæ Rehn.

1900, *Syrbula eslavæ* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 91.

Two males; Cuernavaca. Morelos, Mexico. September. Collected by Otis W. Barrett.

Machærocera mexicana Saussure.

1859, *Machærocera mexicana* Saussure, Revue et Magasin de Zoologie, 2e ser., xi, p. 391.

—— *Machærocera sumichrasti* Thomas, Bull. U. S. Geogr. Surv. Terr., 1st series, No. 2, p. 70, 1874.

Twenty-two specimens; thirteen males, five females, four immature specimens; Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (4). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (1). Jalapa, Vera Cruz, Mexico. September 3–22, 1899. Collected by S. N. and M. C. Rhoads (1). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (4). Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (3). Texolo Vera Cruz, Mexico. Various dates in March, 1899. Collected by S. N. and M. C. Rhoads (9).

After an examination of thirty-two specimens of the genus *Machærocera*, I have reached the conclusion that *sumichrasti* of Thomas is nothing but a phase of this very variable species. The color differences as given by Thomas appear to be of no value, while structural differentiations are absent. The median carina of the pronotum is cut thrice in some specimens, in others twice, while a few have a very faint trace of the third incision.

Amblytropidia mysteca (Saussure).

1861, *Stenobothrus mysteca* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 317.

—— *Amblytropidia auriventris* McNeill, Proc. Davenport Acad. Nat. Sci., vi, p. 227. December 19, 1896.

Seventeen specimens; seven males, nine females, one immature; Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (1). Texolo, Vera Cruz, Mexico. Various dates in March, 1899. Collected by S. N. and M. C. Rhoads (10). Uruapan, Michoacan, Mexico. April 11, 1899. S. N. and M. C. Rhoads (1). Patzcuaro, Michoacan, Mexico. April 5, 1899. Collected by S. N. and M. C. Rhoads (1). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (2). Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.) (2).

The dorsal coloration of this species varies from purplish brown and deep umber to pale ochraceous. The pronotum is longitudinally striped in some specimens, and the orange-tint on the dorsal surface of the abdomen is more highly colored in the males than in the females.

Plectrotettix viatorius (Saussure).

1861, *St[enobothrus] viatorius* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 317.

Eleven specimens; eight males, three females; Orizaba, Vera Cruz, Mexico, January 9–16, 1892 (U. S. N. M.) (6). Texolo, Vera Cruz, Mexico. Various dates in March, 1899. Collected by S. N. and M. C. Rhoads (4). Uruapan, Michoacan, Mexico. April 14, 1899. Collected S. N. and M. C. Rhoads (1).

Some specimens, particularly the large female from Uruapan, show an absence of the blackish maculation on the lateral lobes of pronotum.

Arphia behrensi Saussure.

1884. *Arphia behrensi* Saussure, Prodromus Œdipodiorum, p. 71.

One female; Uruapan, Mexico. April 11, 1899. Collected by S. N. and M. C. Rhoads.

Lactista gibbosus Saussure.

1884. *Lactista gibbosus* Saussure, Prodromus Œdipodiorum, p. 143.

Two specimens, male and female; Mazatlan, Sinaloa, Mexico (Acad. Nat. Sciences, Philadelphia).

This species was described from California, no specimens having since been recorded outside of that State. Measurements of the specimens might be of interest:

	♂	♀
Length of body . . .	15 mm.	22.5 mm.
Length of pronotum . .	4 mm.	5.5 mm.
Length of tegmina . .	17 mm.	23.5 mm.

Tomonotus mexicanus Saussure.

1861, *Tom[onotus] mexicanus* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 321.

Eleven specimens; two males, nine females; Uruapan, Michoacan, Mexico. Various dates in April, 1901. Collected by S. N. and M. C. Rhoads (9). Patzcuaro, Michoacan, Mexico. April 7, 1899. Collected by S. N. and M. C. Rhoads (1). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (1).

The last listed specimen has a comparatively low median carina, but the character of the tempora serve to show that no close relationship exists with *L. orizabæ* Saussure.

Tomonotus orizabæ Saussure.

1884, *Tomonotus orizabæ* Saussure, Prodromus Œdipodiorum, p. 98.

One male; Uruapan, Michoacan, Mexico. April, 1899. Collected by S. N. and M. C. Rhoads.

Trimerotropis fascicula McNeill.

1900, *Trimerotropis fascicula* McNeill, Psyche, ix, p. 31; Proc. U. S. Nat. Mus., xxiii, p. 425, 1901.

Two males; Uruapan, Michoacan, Mexico. April 14, 1899. Collection of S. N. and M. C. Rhoads.

Heliastus aztecus Saussure.

1884, *Heliastus aztecus* Prodromus Œdipodiorum, p. 214.

One female; Monterey, Neuvo Leon, Mexico. April 25, 1899. Collection of S. N. and M. C. Rhoads.

Heliastus sumichrasti (Saussure).

1861, *Œ[dipoda] Sumichrasti* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 324.

Seven specimens; three males, four females; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (5). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (1). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (1).

Sphenarium purpurascens Charpentier.

1845, *Sphenarium purpurascens* Charpentier, Orth. Descr. et Depict., pl. 31, ff. 1-8.

Five specimens; three males, two females; Mexico. (Acad. Nat. Sci. Phila.) (1). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (2). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (two in coitu).

Tæniopoda superba (Stal).

1855, *M[onachidium] superbum* Stal, Ofv. k. Vet.-Akad. Förhand., xii, p. 352.

Five specimens; four males, one female; Gualan, Guatemala. Mrs. S. P. McElroy (U. S. N. M.) (6). Escondido River, fifty miles from Bluefields, Nicaragua. July 31, 1892. Collected by C. W. Richmond (U. S. N. M.) (2). Honduras (U. S. N. M.) (1). No data (Acad. Nat. Sci. Phila.) (1).

Tæniopoda centurio (Drury).

1773, *Gryllus centurio* Drury, Ill. Nat. Hist., ii, p. 78, pl. xli, f. 3.

Twenty-seven specimens; seven males, twenty females; Mexico (Acad. Nat. Sci. Phila.) (3). Qacualtipan, Hidalgo, Mexico (Acad. Nat. Sci. Phila. (1). Jalapa, Vera Cruz, Mexico. August. Collected by Otis W. Barrett (17). Teocelo, Vera Cruz, Mexico. March 1 and 2, 1899. Collected by S. N. and M. C. Rhoads (2). Orizaba, Vera Cruz, Mexico. January 9–15, 1892. Collected by H. Osborn (U. S. N. M.) (4).

Tæniopoda picticornis Stal.

1873, *T[æniopoda] picticornis* Stal, Recensio Orthopterorum, i, p. 51.

Three specimens; two males, one female; Yautepec, Morelos, Mexico. November 17. Collected by Otis W. Barrett (2). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (1).

Chromacris colorata (Serville).*

1839, *Acridium coloratum* Serville, Orthopteres, p. 674.

Two specimens; male and female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (♂). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (♀).

The male is much smaller than specimens of the same sex in my collection from Victoria, Tamaulipas.

* The genus *Romalea* Serville (*Rhomalea* auct.), in which this species has previously been placed is an absolute synonym of *Dictyophorus* Thunberg, the only included species (vide Ann. Sci. Nat., xxii, p. 280, 1831) being the one on which Thunberg's genus was based. The next available name is *Chromacris* Walker (Catal. Derm. Salt. Brit. Mus., iv, p. 644), based on *speciosa* (= *miles*) and *colorata*.

Tropidacris dux (Drury).

1773, *Gryllus* (*Locusta*) *dux* Drury, Illust. Nat. Hist., ii, p. 82, pl. xliv.

Four females; Central America (Acad. Nat. Sci. Phila.) Honduras. J. E. Hawkins and Dr. J. LeConte (Acad. Nat. Sci. Phila.). Omoa, Honduras. Dr. J. LeConte (Acad. Nat. Sci. Phila.). Escondido River, fifty miles from Bluefields, Nicaragua. August 26, 1892. Collected by C. W. Richmond (U. S. N. M.).

EPISCOPOTETTIX* n. gen.

Allied to *Leptysma* Stal, but differentiated by the following characters: the much more elongate and subpyriform vertex and fastigium, the slightly constricted pronotum and the form of the antennæ.

Form very elongate. Head with the vertex and fastigium very much produced, as long as the head posterior to the eyes; face elongate; antennæ elongate, moderately ensiform. Pronotum without definite carinæ; metasternal lobes contiguous through over two thirds of the length of the suture; prosternal spine broad, flat, expanded at the apex, the margin arcuate. Tegmina very narrow, greatly elongate. Hind femora elongate, almost reaching the extremity of the abdomen; tibiæ slender, no apical spine on the external margin.

Episcopotettix sulcirostris n. sp.

Type; male; Forest of San Juan, Mexico.†. (Acad. Nat. Sci. Phila.).

Head mitriform, the interspace between the eyes narrow; vertex thickly punctate, subrugulose, slightly sulcate; fastigium decidedly acuminate, strongly sulcate; eyes oval, rather prominent; antennæ inserted at the base of the fastigium, elongate, flattened, considerably exceeding the head and pronotum, somewhat ensiform basally; frontal costa very narrow; sulcate, margins confluent above, very slightly expanding inferiorly. Pronotum without definite carinæ, transverse sulci four in number, the anterior broken centrally; metazona considerably punctate; anterior margin broadly rounded, posterior arcuate; lower margin of the lateral lobes truncate, subsinuate. Tegmina lanceolate, exceeding the hind femora by their entire length. Anterior and median limbs slender; posterior pair rather elongate, the tibiæ bearing eight spines on the external and ten to twelve on the internal margins. Subgenital plate basally expanded, the aperture U shaped;

* In allusion to the mitriform head.

† The label on the specimen simply gives the information recorded above. The following localities might be compromised: San Juan, Cuautitlan, State of Mexico; San Juan, Distrito Federal; San Juan, Cordoba, Vera Cruz; San Juan (River), southern Vera Cruz.

supranal plate with a raised hastate portion which bears a central depression; cerci filiform, tapering. Color (from specimen evidently from alcohol) ochraceous, darkest on head; disk of wings black.

MEASUREMENTS:

Length of body	28.5 mm.
Length of head	8. mm.
Length of pronotum	5. mm.
Length of tegmina	33. mm.
Length of hind femora	15.5 mm.

Leptysma marginicollis (Seville).

1839, *Opsomala marginicollis* Seville, Orthopteres, p. 591.

One female; Acambaro, Guanajuato, Mexico. March 30, 1899. Collected by S. N. and M. C. Rhoads.

No difference can be detected on comparison with specimens from Miami, Florida.

Aleuas toltecus (Saussure).

1861, *A[cridium] toltecum* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 163.

Nine specimens; four males, five females; Teocelo, Vera Cruz, Mexico. Various dates in March, 1899. Collected by S. N. and M. C. Rhoads (5). Motzorongo, Vera Cruz, Mexico. February, 1892 (U. S. N. M.) (1). Yucatan. Collected by Schott (Acad. Nat. Sci. Phila.) (1). Escondido River, fifty miles from Bluefields, Nacaragua. September 3, 1892. Collected by C. W. Richmond (U. S. N. M.) (2).

This species does not fully agree with Stal's descriptions of *Aleuas*, the lower margin of the lateral lobes being sinuate (as in *Paraleuas*) and not straight. The characters of agreement are the interspace between the mesosternal lobes in the female (open instead of closed), and in the width of the interspace between the eyes.

Schistocerca vaga (Scudder).

1876, *Acridium vagum* Scudder, Proc. Boston Soc. Nat. Hist., xviii, p. 269.

Two females; Texolo, Vera Cruz, Mexico. March 21, 1899. Collected by S. N. and M. C. Rhoads. Orizaba, Vera Cruz, Mexico. January 9–16, 1892 (U. S. N. M.).

Schistocerca pyramidata Scudder.

1899, *Schistocerca pyramidata* Scudder, Proc. Amer. Acad. Arts and Sci., xxxiv, p. 454.

Eight specimens; three males, five females; Uruapan, Michoacan, Mexico. April 11–13, 1899. Collected by S. N. and M. C.

Rhoads (4). Texolo, Vera Cruz, Mexico. March 11–20, 1899. Orizaba, Vera Cruz, Mexico. January 1–16, 1892 (U. S. N. M.) (2).

With the material before me it seems that this species is but slightly removed from *S. vaga*, the amount of color variation in my series of twelve specimens being very great.

Schistocerca lineata Scudder.

1899, *Schistocerca lineata* Scudder, Proc. Amer. Acad. Arts and Sci., xxxiv, p. 465.

One female; Bolanos, Jalisco, Mexico. J. N. Rose, 1897 (U. S. N. M.).

This specimen exhibits a well defined flavous bar on the lateral lobes of the pronotum, the superior border of this tint being contrasted by a blackish patch situated above it.

Schistocerca americana (Drury).

1770, *Gryllus americanus* Drury, Ill. Nat. Hist., i, p. 128, pl. xlix, fig. 2.

Three males; Honduras (Acad. Nat. Sci. Phila.) (2). Panama (Acad. Nat. Sci. Phila.) (1).

Aidemona azteca (Saussure).

1861, *Pl[atyphyma] aztecum* Saussure, Revue et Magasin de Zoologie, 2e ser., xiii, p. 161.

Eleven specimens; five males, six females; Uruapan, Michoacan, Mexico. April 10 and 11, 1899. Collected by S. N. and M. C. Rhoads (5). Texolo, Vera Cruz, Mexico. March 3 and 13, 1899. Collected by S. N. and M. C. Rhoads (5). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. (U. S. N. M.) (1).

Melanoplus elongatus Scudder.

1897, *Melanoplus elongatus* Scudder, Proc. U. S. Nat. Mus., xx, p. 160.

One male; Monterey, Neuvo Leon, Mexico. 1899. Collected by S. N. and M. C. Rhoads.

Melanoplus atlanis (Riley).

1875, *Caloptemus atlanis* Riley, Ann. Rep. Ins. Missouri, vii, p. 169.

One male; Patzcuaro, Michoacan, Mexico. April 7, 1899. Collected by S. N. and M. C. Rhoads.

Family TETTIGONIDÆ.

Steunopelmatus typhlops n. sp.

Type: female; Qacualtipan, Hidalgo, Mexico (Acad. Nat. Sci. Phila.).

Allied to *S. nieti* Saussure, but differing in the less punctate posterior border of the pronotum, the less prominent "boss" on the lower part of the face, the rotundate labrum (much as in *S. ater*), and the greater rugosity of the maxillæ.

Size small (in comparison with *S. nieti*); general build heavy and powerful. Head with the facial aspect obovate; the upper surface smooth, the interocular region strongly rugose; "boss" on the lower part of the face very slightly developed and finely rugulose; eyes small, obovate; labrum moderately developed, rotundate; maxillæ entirely rugose; antennæ filiform, much longer than head and pronotum. Pronotum convex, both longitudinally and transversely; anterior margin shallowly emarginate, with a well developed post-marginal sulcus; posterior margin very slightly emarginate; upper surface of the pronotum comparatively smooth, the deflected lateral portion moderately rugulose. Anterior and median limbs short and thick. Posterior femora considerably inflated, the lower margins well marked; posterior tibiæ decidedly shorter than the femora, the external margin with three spines, the internal with five spines, apical spurs six in number, the internal ones longest. Ovipositor short, falcate, the tip sharply recurved.

General color blackish, lightest on the abdomen and the sternum; eyes straw-color.

MEASUREMENTS:

Length of body (exclusive of ovipositor) . .	24.5 mm.
Length of pronotum	8. mm.
Greatest width of pronotum	9. mm.
Length of ovipositor	5. mm.

Anabropsis* mexicanus (Saussure).

1859, *Sch[ænobates] mexicanus* Saussure, Revue et Magas. de Zool., 2e ser., xi, p. 209.

One male; Mexico. (Acad. Nat. Sci. Phila.)

Anabropsis saltator Saussure and Pictet).

1897, *Schænobates saltator* Saussure and Pictet, Biol. Cent.-Amer., Orth., i, p. 294, tab. xiv, f. 16.

One male; Qacualtipan, Hidalgo, Mexico. (Acad. Nat. Sci. Phila.)

The species was previously known from Volcan de Irazu, Costa Rica.

Glaphyrosoma gracile Brunner.

1888, *Glaphyrosoma gracile* Brunner, Verh. Zool.-bot. Gesell. Wien, xxxviii, p. 284.

One female; Jalapa, Vera Cruz, Mexico. March 22, 1899. Collected by S. N. and M. C. Rhoads.

* For the use of this name in place of *Schænobates*, see Rehn, Canad. Ent., xxxiii, p. 272.

PRISTOCEUTHOPHILUS n. gen.

Allied to *Hadenœcus*, *Ceuthophilus* and *Hemiudeopsylla*, but presenting quite distinctive characters. It differs from all in the possession of but three pairs of spurs on the posterior tibiæ, and in having a conoid development of the vertex. From *Hadenœcus* it is separated by the elongate last palpal joint, and by the broadly emarginate subgenital plate of the male. From *Ceuthophilus* it differs in the non spinous median coxæ, and in the very long first hind tarsal joint. From *Hemiudeopsylla* difference is noticed in the absence of spines on the lower external margin of the median femora, in the absence of serrations on the lower external margin of the posterior femora, and in the presence of five or more small spines between the larger spines on the upper margins of the posterior tibiæ.

Vertex produced into a deflected spinous process, extending almost as far downward as the lower border of the eyes. Last palpal joint almost twice as long as its antecedent. Anterior femora without spines. Median coxæ not spined; femora smooth, except for the spine on the apex of the external portion; tibiæ bearing several closely appressed spines situated around the central section. Posterior femora bullate, the lower external margin non serrate, carrying one (or two) small spines on the apical half; tibiæ bearing many (five to thirteen) small spines between the larger ones; apical spurs three in number; first tarsal joint very long, much longer than the remaining portion. Subgenital plate broadly emarginate.

Pristoceuthophilus rhoadsi n. sp.

Type: male; Uruapan, Michoacan, Mexico. April 11, 1899. Collected by S. N. and M. C. Rhoads.

Size small. Head projecting but little beyond the pronotum. glabrous; eyes subtriangular, very slightly projecting; antennæ heavy, rather long; palpi long, the terminal joint subarcuate. Pronotum strongly rounded transversely, very slightly so longitudinally; anterior and posterior margins truncate, lower margin of the lateral portions very slightly sinuate; median portion bearing a very faint longitudinally disposed sulcus; posterior portion bearing a number of irregular rugosities. Mesonotum with rugosities similar to those on the pronotum placed across the posterior portion. Anterior femora slightly longer than the pronotum, unarmed, strongly sulcate below; tibiæ slightly shorter than the femora, lower surface bearing three closely appressed spines on the distal portion, apical spines four in number the lower pair the larger; first tarsal joint fully as long as the

succeeding ones. Median femora unarmed except for the spine on the external genicular lobe, sulcate below; tibiæ bearing four closely appressed spines around the median portion of the limb, apical spines as on the anterior tibiæ; first tarsal joint as long as the remaining joints of the tarsi. Posterior femora considerably inflated, genicular lobes rounded, lower external margin bearing one (or two) spines on the distal portion, lower surface sulcate; tibiæ slightly longer than the femora, multispinose, the larger spines four in number and confined to the apical two-thirds of the limb, the smaller spines closely placed from the proximal to the distal extremity except for the larger spines, the latter being placed closer as the apex is approached, the number of small spines in the apical interspace being five, while the interspace between the third and fourth large spine contains thirteen; first tarsal joint very long, considerably exceeding the other joints together. Subgenital plate subtriangular, apex broadly emarginate.

General color ochraceous, blotched and barred with wood-brown, this tint being blackish brown on the abdomen. Borders of the pronotum, mesonotum and metanotum, hind femora and vertex strongly blotched with overlying tint. Lower margin of the hind femora alternate blocks of blackish and ochraceous.

MEASUREMENTS:

Length of body	10. mm.
Length of pronotum	3.5 mm.
Length of hind femora	9. mm.

Camptonotus affinis n. sp.

Types: one male, two females; Mexico (Acad. Nat. Sci. Phila.) (2). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (1).*

Closely allied to *C. carolinensis* (Gerstaecker), but considerably smaller, with relatively shorter cerci and more elongate subgenital plate, and with fewer spines on the external margin of the hind tibiæ (4 or 5 instead of 7 or 8).

Size small (♂) or medium (♀); body entirely glabrous. Head rounted, interocular space narrower in the male than in the female; eyes moderately exserted; antennæ filiform. Pronotum saddle-shaped; anterior margin subarcuate, posterior very broadly emarginate, lower margin of the lateral portion with the posterior portion diagonally trimmed, the whole periphery bearing a very perceptible shoulder most marked on the lateral portion. Mesonotum and metanotum not as deep laterally as the pronotum, neither more than half as long as the latter. Abdomen robust, rather bullate in the male. Anterior and median femora rather full, unarmed except for the apical spine, the anterior slightly the longer; anterior and median femora with three spines on each lower margin, femora and tibiæ shallowly sulcate below. Posterior femora short, rather robust, moderately sulcate below, lower borders distally with a number of small spines (2 to 6); tibiæ about as long as the femora, both upper margins with 4 or 5 spines.

♂. Subgenital plate elongate, apex triangularly emarginate; styles small in-

* Additional information with this latter specimen is to the effect that it was "taken while ovipositing in mortar-cracks."

curved, not half as long as the median length of the plate. Cerci slender, tapering, much shorter than the median length of the subgenital plate.

♀. Ovipositor falcate, considerably bent near the base.

General tint straw-color, the pronotum, mesonotum, metanotum and abdominal segments being edged with mahogany, the overlying tint being diffused over the basal and apical abdominal segments.

MEASUREMENTS:			*C. carolinensis.*
	♂	♀	♂*
Length of body (exclusive of ovipositor).	11.5 mm.	14.5 mm.	14. mm.
Length of pronotum	3. mm.	3.2 mm.	3.5 mm.
Length of ovipositor		7.5 mm.	

Ægimia cultrifera Stal.

1874, *Ægimia cultrifera* Stal, Recensio Orthopterorum, ii, p. 46.

One male; Teocelo, Vera Cruz. September. Collected by Otis W. Barrett.

Ægimia elongata n. sp.

Type: male; Central America (U. S. N. M.).

Allied to *Æ. cultrifera* Stal, but differing in the raised lateral carinæ of the pronotum and the more general concave form of the same, in the more elongate tegmina and wings, in the tridentate lobe on the median tibiæ, and in smaller size of the tympanum which is *cultrifera* is larger in extent than the dorsum of the pronotum, while relatively in *elongata* the same area is considerably less.

Size rather large. Head more or less ruguiose; cultriform development of the vertex rather long, lateral outline tapering, below moderately sulcate, apex shallowly emarginate; eyes obovate, the apex directed upwards and backwards; antennæ filiform, annulated with blackish rings. Pronotum rather long; the lateral carinæ heavy, rather rugose, considerably elevated; anterior margin broadly emarginate, the posterior arcuate; posterior margin of the lateral lobes broadly arcuate, the anterior angle obtuse. Tegmina elongate; costal area comparatively narrow; tympanum considerably less than the dorsal aspect of the pronotum in extent, the stridulating vein straight, transverse (arcuate in *cultrifera*). Wings ample, almost reaching to the tip of the tegmina. Anterior and median femora heavy and deep, sulcate below, the anterior with five spines on the lower external margin; anterior tibiæ rather heavy, straight; median tibiæ with the accessary lobe tridentate. Posterior limbs missing.

As the specimen is very old, probably having been taken from alcohol, the original coloration is totally gone, the specimen now being uniform brownish.

MEASUREMENTS:	*Æ. elongata* ♂.	*Æ. cultrifera* ♂.
Length of body	31. mm.	31. mm.
Length of pronotum	8.7 mm.	7. mm.
Greatest width of pronotum .	6.5 mm.	6. mm.
Length of tegmina	44.5 mm.	41. mm.

* Measurements from a specimen from St. Augustine, Florida.

Greatest width of tegmina . .	19. mm.	22. mm.
Length of median femora . .	8. mm.	6.5 mm.
Length of median tibiæ . .	7. mm.	6. mm.

Aphidnia fuscifrons Brunner.

1878, *A[phidnia] fuscifrons* Brunner, Monogr. d. Phaneropt., p. 153.

One female; Texolo, Vera Cruz, Mexico. March 7, 1899. Collected by S. N. and M. C. Rhoads.

Hormilia gracillima Brunner.

1878, *H[ormilia] gracillima* Brunner, Monogr. d. Phaneropt., p. 231.

One male; Cuernavaca, Morelos, Mexico.. September. Collected by Otis W. Barrett.

Scudderia mexicana (Saussure).

1861, *Phaneroptera mexicana* Scudder, Revue et Magasin de Zoologie, 2e ser., xiii, p. 129.

Three specimens; two males, one female; Cuernavaca, Morelos, Mexico.. September. Collected by Otis W. Barrett.

Symmetropleura teocelæ Rehn.

1901, *Symmetropleura teocelæ* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 222.

One male; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Phrixa schumanni Saussure and Pictet.

1897, *Phrixa schumanni* Saussure and Pictet, Biol. Cent.-Amer., Orth., i, p. 334.

One female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

This specimen agrees fairly well with the original description, though the anterior angle of the lateral lobes is obtuse-angulate and not subrotundate.

Phrixa bidentata n. sp.

1900, *Phrixa nasuta* Rehn (not of Stal), Trans. Amer. Ent. Soc., xxvii, p. 88.

Type: male; Orizaba, Vera Cruz, Mexico. June. Collected by Otis W. Barrett.

Closely allied to *P. hœgei* Saussure and Pictet (Biol. Cent.-Amer., Orth., I, p. 334), but differing in the form of the extremity of the cerci which are strongly bidentate, the intermediate diastema being considerably emarginate, while in *P. hœgei* the extremity is acute, the additional lobe being rotundate. No affinity exists with *P. maya* Saussure and Pictet, the cerci in that species being strongly falcate, and terminally acuminate.

Size medium. Head with the vertex developed into a conoid process of considerable length; eyes globose, much exserted; antennæ filiform, rather long; region of the frontal costa considerably swollen. Pronotum sub-sericeous; anterior margin sub-truncate, the posterior arcuate; lateral lobes deeper than long, the anterior and posterior margins straight, lower margin arcuate, anterior angle apparent. Tegmina rather elongate; apex diagonally trimmed; tympanum rather small, the stridulating vein not more apparent than the other veins of the same area. Wings extending to the apex of the tegmina. Anterior and median femora slender, unarmed except for the genicular spines, the median considerably longer than the anterior, both deeply sulcate inferiorly; tibia slender, quadrate in section, anterior pair with several spines on the lower margins, the posterior with many spines on the lower margins, the proximal portion unarmed, the distal extremity with the spines closely placed. Posterior femora slender, sulcate below, the distal portion of the lower margins with a number of small spines, the internal margin with fewer spines, genicular lobes produced; tibiæ considerably longer than the femora, quadrate, margins entirely spined, in the proximal section sparser than in the distal. Subgenital plate elongate, bicarinate, the apex truncate; styles short and stout. Cerci lunate, the apex expanded, terminal portion produced, supplemented by a sub-terminal tooth, the resulting diastema being considerably emarginate.

General color pea green, tinged on the head and pronotum with an ashy tint; a yellow line extending from the extremity of the vertex to the border of the pronotum; eyes reddish brown.

MEASUREMENTS:

Length of body	17. mm.
Length of pronotum	5.5 mm.
Length of tegmina	31.5 mm.
Length of hind femora	19.5 mm.

Pycnopalpa mortuifolia* n. sp.

Type: male; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Allied to *P. bicordata* Serville, but differing in the more dentate and non-lamellate lower margin of the anterior femora, the anterior border of the pronotum being more deeply emarginate, the posterior border more shallowly emarginate, and the wings also elongate.

Size small. Head with the vertex developed into an elongate, sulcate process bearing two lateral spines and a basal denticle, the extremity of the vertex being narrowly truncate; eyes ovate, strongly exserted; face below the eyes bearing a pair of wide shallow sulcations extending to the base of the clypeus; region between the antennal bases with a blunt, wart-like process; antennæ filiform. Pronotum narrow, sub-concave above; the anterior margin broadly, triangularly emarginate, posterior bi-arcuate, the central emargination being slight; central

* The genus *Pycnopalpa* Serville (Orthopteres, p. 408, 1839), antedates *Plagioptera* Stal (Recens. Orthopt., ii, p. 16, 1874), and was based on a single species—*Locusta bicordata* Serville.

portion of the lateral carinæ strongly callous, the rugosity extending across, joining its fellow, and dividing the central sericeous area into two parts, an anterior cordate, and a posterior sub-pyriform area; lateral lobes as broad as deep, the anterior margin sinuate, anterior lower angle rounded, posterior margin well rounded. Tegmina rather short, centrally with a "dead" spot of considerable size, another of similar character occupying the distal portion of the lower margin and involving the lower margin of the closed wing. Wings rather long, considerably exceeding the tegmina. Anterior and median femora armed below distally with three large spines, the apical two being quite large; tibiæ bearing several spines on the lower margins, the limbs hirsute. Posterior femora slender, the swollen basal portion superiorly rugulose, lower margin centrally with three blunt teeth; tibiæ considerably longer than the femora, quadrate, both margins strongly spined above, the lower margins with few spines. Subgenital plate broad, papillose, the styliform processes short and directed outward. Cerci tapering, slightly curved towards the acute apex.

General tint a combination of greenish yellow and dull brown, the effect being that of a dead leaf. Tegmina yellowish green centrally, becoming greenish yellow toward the periphery; base, borders of the tympanum, edging of the "dead" spots and the general suffusing tint of the lateral lobes and femora dull umber. Pronotum above with sericeous areas dull golden yellow, the callous ridges and upper surface of head with the antennæ and the ground color of the limbs creamy; eyes vinaceous. Limbs and annulations of the antennæ blackish brown.

MEASUREMENTS:

Length of body	14. mm.
Length of pronotum	4.2 mm.
Length of tegmina	23. mm.
Length of hind femora	12.5 mm.

Amblycorypha guatemalæ Saussure and Pictet.

1897, *Amblycorypha guatemalæ* Saussure and Pictet, Biol. Cent.-Amer., Orth., i, p. 336.

One male; Escondido River, fifty miles from Bluefields, Nicaragua. August 15, 1892. Collected by C. W. Richmond (U. S. N. M.).

Paragenes conspersa (Brunner).

1878, *A*[*nepsia*] *conspersa* Brunner, Monogr. der Phaneropt., p. 270.

One male; Mexico. (Coll. Acad. Nat. Sci. Phila.).

Anaulacomera laticauda Brunner.

1878, *A*[*naulacomera*] *laticauda* Brunner, Monogr. der Phaneropt., p. 292.

One male; Honduras. (Coll. Acad. Nat. Sci. Phila.).

Microcentrum lanceolatum (Burmeister).

1838, *Ph*[*ylloptera*] *lanceolata* Burmeister, Handb. d. Ent., ii, p. 692.

One female; Panama. (Coll. Acad. Nat. Sci. Phila.).

Microcentrum syntechnoides n. sp.

Type: male; Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett.

Allied to *M. lanceolatum* Burmeister, but differing in the much more lanceolate elytra.

Size rather large. Head rather broad; vertex thick, the fastigium slightly expanded, rounded, about twice as wide as the first antennal joint; eyes large, subglobose; antennæ filiform. Pronotum rather broad; lateral borders rounded, slightly marked posteriorly; anterior margin truncate, posterior arcuate; lateral lobes very deep, the anterior border straight, lower margin sub-rotundate. Tegmina elongate, the tympanum occuping a relatively small portion of the posterior margin, the sutural part of which is straght; lower margin gently arcuate, apex rounded; median vein separating before the middle of the elytra, and with both forks reaching the sutural margin; marginal field basally quite broad, the basal portion of the margin ornamented with a series of small callous nodules. Wings large, considerably exceeding the tegmina in length. Anterior and median femora smooth, sulcate below; tibiæ slender, the lower margins spined, the median pair bearing several spines on the upper margin also. Posterior femora elongate, the enlarged basal portion tapering very gradually into the slender distal portion, sulcate below, the apical portion carrying about six spines on each margin, genicular lobes bispinose; tibiæ quadrate, longer than the femora, strongly and closely spined on all the margins. Subgenital plate rather elongate, keeled, the extremity developed into a pair of forcep-like processes, touching by their tips,* the enclosed space being marginally truncate.

MEASUREMENTS:

Length of body	26.5 mm.
Length of pronotum	7.2 mm.
Length of tegmina	47. mm.
Greatest width of tegmina	11.5 mm.
Length of posterior femora	27.5 mm.

Microcentrum retinerve (Burmeister).

1838, *Ph*[*ylloptera*] *retinervis* Burmeister, Handb. der Ent., ii, p. 692.

One male; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Microcentrum laurifolium (Linnæus).

1758, [*Gryllus*] *laurifolius* Linnæus, Syst. Nat., x ed., p. 429.

Two specimens; one male, one female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett. Mexico. (Coll. Acad. Nat. Sci. Phila.).

Petaloptera confusa n. sp.

Type: female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Closely allied to *P. filia* Brunner, but differing in the form of the

* These processes occupy the same position as styles, to which they bear a very close resemblance.

vertex, the latter being sub conoid, with the apex emarginate instead of acuminate as in *filia*, and also in the more general posterior trend of the veins in the area between the anterior and posterior ulnar veins.

Size medium. Head with the vertex developed into a sub-conoid process, the apex of which is deeply emarginate, a very perceptible sulcus extending backwards from the apex on the superior surface of the vertex, lateral portion of the vertex considerably excavated; eyes globose, very much exserted; face considerably retreating; antennæ filamentous, reaching to the extremity of the tegmina. Pronotum flat above, comparatively narrow; anterior margin shallowly emarginate, posterior broadly arcuate; lateral lobes about equally long as deep, the anterior angle very obtuse, the posterior rounded. Tegmina broad; anterior margin slightly sinuate, the posterior strongly arcuate, apex sub-acute; veins in the area between the anterior and posterior ulnar veins with a marked posterior trend, median vein with its two branches reaching the sutural margin. Wings long, considerably exceeding the tegmina, apex acute. Anterior and median femora sulcate beneath; tibiæ very slender, spined on the lower margins. Posterior femora considerably inflated in the proximal portion, the distal section being very slender and bearing small spines on both margins, genicular lobes with two spines, the superior one larger; tibiæ quadrate, spined on all the margins, the inferior borders with the spines fewer in numbers. Ovipositor rather slender, moderately long, somewhat bent near base. Subgenital plate very narrow, acuminate, excavated superiorly.

General color pea-green fading to a yellowish green on the proximal portions of the tegmina, pronotum, head, anterior limbs and basal portion of the posterior tibiæ.

MEASUREMENTS:

Length of body (excl. of ovipositor) . .	28.5 mm.
Length of pronotum	6.5 mm.
Length of tegmina	41.5 mm.
Greatest width of tegmina	14. mm.
Length of posterior femora	20.5 mm.
Length of ovipositor	6. mm.

Syntechna caudelli Rehn.

1901, *Syntechna caudelli* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 224.

One male; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

Philophyllia guttulata Stal.

1872, *P[hilophyllia] guttulata* Stal, Ofver. K. Vetensk.-Akad. Förhandl., xxx, p. 42.

Six specimens; four males, two females; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (5). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (1).

Stilpnochlora marginella (Serville).

1839, *Phylloptera marginella* Serville, Orthoptères, p. 405.

One male; Guatemala (U. S. N. M.)

Stilpnochlora tolteca (Saussure).

1861, *Ph[ylloptera] tolteca* Saussure, Revue et Magasin de Zoologie, 2e ser., xi, p. 203.

Fourteen specimens; six males, eight females; Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (6). Teocelo, Vera Cruz, Mexico. Collected by Otis W. Barrett (6). Mexico. Coll. Acad. Nat. Sci. Phila. (2).

Stilpnochlora azteca (Saussure).

1859, *Ph[ylloptera] azteca* Saussure, Revue et Magasin de Zoologie (2e ser.), xi, p. 203.

Thirty-eight specimens; twenty males, eighteen females; Jalapa, Vera Cruz, Mexico. April, June and September. Collected by Otis W. Barrett (14). Cuernavaca, Morelos, Mexico. June. Collected by Otis W. Barrett (5). Teocelo. Vera Cruz, Mexico. September. Collected by Otis W. Barrett (19).

Peucestes coronatus Stal.

1874, *P[eucestes] coronatus* Stal Recensio Orthopterorum, ii, p. 45.

One male; Central America (U. S. N. M.).

This specimen has the teeth on the lateral carinæ of the pronotum much heavier, and each decidedly acuminate.

Posidippus sp.

One female; San Juan River, Nicaragua. Coll. Acad. Nat. Sci. Phila.

This specimen is very much damaged and faded, having been taken from alcohol and dried. It is clearly not *P. validus* Saussure and Pictet (Biol. Cent.-Amer., Orth., i, p. 373, tab. xviii, figs. 10 and 11), and appears to be closest related to *P. dohrni* Brunner (Verh. Zool.-bot. Gesell. Wien, xli, pp. 183 and 185, 1891) from the upper Amazon region.

Copiphora rhinoceros (Pictet).

1890, *C[opiophora] rhinoceros* Pictet, Mém. Soc. Phys. et d'Hist. Nat. Genev., xxx, No. 6, p. 48, tab. 2, fig. 25.

One immature female; Machuca, Nicaragua. Coll. Acad. Nat. Sci. Phila.

This specimen differs from Pictet's figure in having the vertex straight, not arcuate.

Eriolus mexicanus (Saussure).

1859, *C[opiophora] mexicana* Saussure, Revue et Magasin de Zoologie, 2e ser., xi, p. 207.

One female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

This specimen presents a slight difference from Saussure and Pictet's figure (Biol. Cent.-Amer., Orth., i, tab. xix, fig. 4) in having the posterior angle of the lateral lobes of the pronotum acute.

Pyrgocorypha sallei (Saussure).

1859, *C[onocephalus] sallei* Saussure, Revue et Magasin de Zoologie, 2e ser., xi, p. 207.

Nineteen specimens; nine males, ten females; Mexico. Coll. Acad. Nat. Sci. Phila. (4). No data. Coll. Acad. Nat. Sci. Phila. (1). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (11). Teocelo, Vera Cruz, Mexico. Collected by Otis W. Barrett (3).

Both brown and green phases are represented.

Pyrgocorypha uncinata (Harris).

1842, *Conocephalus uncinatus* Harris, Inj. Ins. New Engl. p. 132.

Three specimens; one male, two females; Mexico. Coll. Acad. Nat. Sci. Phila. (1). Yucatan. Schott. Acad. Nat. Sci. Phila. (2).

Caulopsis cuspidata (Scudder).

1879, *Conocephalus cuspidatus* Scudder, Proc. Bost. Soc. Nat. Hist., xx, p. 88.

Two females; Honduras. Coll. Acad. Nat. Sci. Phila. Escondido River fifty miles from Bluefields, Nicaragua. August 15, 1892. Collected by C. W. Richmond (U. S. N. M.).

Conocephalus macropterus Redtenbacher.

1891, *Conocephalus macropterus* Redtenbacher, Verhandl. Zool.-bot. Gesell. Wien, xli, p. 402.

Seven specimens; one male, six females; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.) (1). Jalapa, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (4). Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (2).

Xiphidium ictum Scudder.

1875, *Xiphidium ictum* Scudder, Proc. Bost. Soc. Nat. Hist., xvii, p. 461.

Two specimens; one male, one female; Motzorongo, Vera Cruz, Mexico. February 13, 1892. Collected by H. Osborn (U. S. N. M.). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Xiphidium mexicanum Saussure.

1859, *X[iphidium] mexicanum* Saussure, Revue et Magasin de Zoologie, 2e ser., xi, p. 208.

1901, *Xiphidium ictum* Rehn [part] (not of Scudder), Trans. Amer. Ent. Soc., xxvii, p. 226.

Nine specimens; five males, four females; Jalapa, Vera Cruz, Mexico. August. Collected by Otis W. Barrett (2). Cuernavaca, Morelos, Mexico. September. Collected by Otis W. Barrett (1). Uruapan, Michoacan, Mexico. April 11, 1899. Collected by S. N. and M. C. Rhoads (2). Texolo, Vera Cruz, Mexico. March 1, 3 and 13, 1899. Collected by S. N. and M. C. Rhoads (4).

Acanthodis variegata Brunner.

1895, *Acanthodis variegata* Brunner, Monogr. der Pseudophyll., p. 112.

One female; Mexico. Coll. Coll. Acad. Nat. Sci. Phila.

This specimen differs somewhat from Brunner's description in having three species on the lower surface of the anterior femora and four on the lower posterior margin of the median tibiæ.

Gongrocnemis incerta Brunner.

1895, *Gongrocnemis incerta* Brunner, Monogr. der Pseudophyll., p. 167.

Two males; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett.

One specimen does not agree with a female specimen from Jalapa and the other male in the color of the face, which is ashy instead of black. The cerci are long and attenuate, Brunner's description giving these as "breves in apice ipso attenuato."

Idiarthron clavicercum n. sp.

Type: male; Gualan, Guatemala. Mrs. S. P. McElroy (U. S. N. M.).

Apparently allied to *I. furcatum* and *atrispinum*, but differing in the form of the supranal plate which is short and triangular, and the cerci which are heavy, with the apical portion much expanded and bearing two teeth.

The singularity of this species causes the author to describe it in

spite of the great variability which has been found to exist in the allied species of the genus.*

Size medium. Head rotundate; vertex produced, sulcate, the fastigium acuminate, slightly upturned; eyes sub-globose, exserted; antennæ filiform, over twice as long as the body. Pronotum obscurely tuberculate, the transverse sulci strongly impressed; anterior margin rotundate, posterior margin truncate; lateral lobes with slightly sinuate lower margins. Tegmina reaching to the extremities of the hind femora, narrow, venation very prominent. Wings slightly inferior to the tegmina in length. Anterior and median femora armed on the anterior lower margins with from five to seven spines; anterior tibiæ broad, the lower margins of both anterior and median pair with from seven to eight rather small spines. Posterior femora very much inflated, the genicular lobes rounded, the external lower margin bearing eight spines; tibiæ quadrate, all of the margins spined, the lower two with more numerous and heavier spines. Supranal plate small, triangular, longitudinally sulcate. Cerci short, robust, the apical portion very much thickened and expanded, one tooth very short and blunt, the internal one directed inwards, elongate, spiniform, the diastema broadly emarginate. Subgenital plate produced, apically with a deep triangular emargination; styles fusiform, as long as the free portion of the subgenital plate.

General color wood-brown; the veins, occiput, margins of the pronotum and spines on the limbs black.

MEASUREMENTS:

Length of body (approximately)†	35.5 mm.
Length of pronotum	7.5 mm.
Length of tegmina	27.5 mm.
Length of hind femora	21. mm.

Liparoscelis nigrispina Stal.

1873, *Liparoscelis nigrispina* Stal, Ofv. K. Vet.-Akad. Förhandl., xxx, No. 4, p. 49.

Twelve specimens; six males, six femaies; Yucatan. Schott. Acad. Nat. Sci. Phila. (1). Tekanto, Yucatan. Acad. Nat. Sci. Phila. (11).

Cocconotus castus Brunner?

1895, *Cocconotus castus* Brunner, Monogr. der Pseudophyll., p. 210.

Two females; Mexico. Acad. Nat. Sci. Phila.

These specimens are rather doubtfully assigned to this species, of which only males have previously been known.

Cocconotus modestus Brunner?

1895, *Cocconotus modestus* Brunner, Monogr. der Pseudophyll., p. 204.

One female; Honduras (U. S. N. M.)

* Vide Saussure and Pictet., Biol. Cent.-Amer., Orth., i. pp. 423, 424.

† Exact measurement with dividers is here impossible, as the abdomen is very much depressed and bent.

This specimen is doubtfully assigned to this species, as the median tibiæ possess several spines,* and five spines are present on the anterior femora instead of three or four.

Cocconotus ignobilis Brunner.

1895, *Cocconotus ignobilis* Brunner, Monogr. der Pseudophyll., p. 210.

Three specimens; two males, one female; Panama (U. S. N. M.)

Cocconotus lignicolor n. sp.

Type: female; Machuca, Nicaragua (Acad. Nat. Sci. Phila.).

Allied to *C. æthiops* Brunner, but differing in the absence of black on the basal joint of the antennæ and on the vertex and pronotum, in the presence of black on the labrum (which is ferrugineous in *æthiops*), in the presence of four spines (instead of one) on the anterior femora, and in the very narrowly emarginate tip of the subgenital plate.

Size medium. Vertex with two basal tubercles rather prominent; eyes globose. Pronotum verruculate, centrally constricted, posterior sulcus distinctly marked; anterior margin broadly rotundate, posterior subtruncate; lateral lobes longer than high, sub-glabrous, lower margin sinuate, anterior angle rotundate. Tegmina rather long, not quite reaching to the tip of the ovipositor, apex subacuminate. Wings as long as the tegmina. Anterior femora bearing four spines on the inferior internal margin, genicular lobes rounded; anterior tibiæ with six or seven spines on the internal and external lower margins, foramina slightly inflated. Median femora bearing three spines on the external inferior margin, internal genicular lobe bluntly spined, external rounded; tibiæ with seven spines on the inferior margins, Posterior femora moderately inflated, lower margin with six spines; tibiæ as long as femora, basally not spined. Prosternum with two erect tapering processes; mesosternum rectangulate, the posterior margin centrally emarginate; metasternum anteriorly truncate, posteriorly acuminate, foramina of an inverted T shape. Ovipositor rather long, stout, subfalcate, apex acuminate; subgenital plate triangular, centrally sulcate, apex very narowly emarginate.

General color broccoli brown, the anterior border of the lateral lobes of the pronotum, the spines on the limbs, the labrum, mandibles (except the base which is the general tint), the base of the clypeus, a narrow median line on the face, and the superior and inferior margins of the basal two-thirds of the ovipositor black.

MEASUREMENTS:

Length of body (including ovipositor) . .	46.5 mm.
Length of pronotum	6.5 mm.
Length of tegmina	34.5 mm.
Width of tegmina	8. mm.
Length of hind femora	19. mm.
Length of hind tibiæ	19.5 mm.
Length of ovipositor	18. mm.

* This character seems unworthy of the importance which Brunner has given it.

Cocconotus bellicosus n. sp.

Type: female; Cocos Island, Pacific Ocean.* February 38, 1891.

Allied to *C. striolatus* Redtenbacher, from St. Vincent, and *C. globosus* Bruner, from Mexico and Guatemala. From the former it differs in the non-pilose body, in the subdepressed form of the central part of the pronotum, in the broadly emarginate central portion of the posterior margin of the same region, the more curved ovipositor, and the presence of five species on the median femora. From the latter it differs in the non constricted pronotum, the subtruncate posterior margin of the pronotum, and in the triangular subgenital plate of the female.

Size rather large; general build robust, body glabrous. Head with the vertex bearing a pair of rotundate tubercles and an anteriorly directed spinose process; antennæ elongate, subfiliform; eyes spherical, slightly exserted. Pronotum strongly rugulose, the lateral lobes smoother than the dorsal aspect; anterior margin arcuate, posterior subtruncate with a broad central emargination; lateral lobes slightly longer than deep, the lower margins subtruncate, central portion thickened. Tegmina rather long, moderately broad, apex rounded. Wings ample, reaching almost to the tip of the tegmina. Anterior femora subcompressed, the external lower margins bearing four spines on the distal portion; tibiæ quadrate, the lower margins spined. Median femora subcompressed, the external lower margins bearing five spines; tibiæ quadrate, the lower margins spined. Posterior femora considerably expanded basally, the external lower margin bearing eight large spines on the distal two-thirds; tibiæ quadrate, all margins spined except for a small basal portion, the lower surface with the spines sparser in numbers than the upper surface. Ovipositor slender, curved, the apex accuminate, the lower margin with a well-defined basal shoulder. Subgenital plate triangular-acuminate, deeply and narrowly emarginate apically.

General color yellowish chocolate color, the tegmina and limbs sprinkled with darker patches of pure chocolate color. Pronotum and head marked with black, which color suffuses the extreme tip on all the spines on the limbs. Wings pale grayish hyaline, the longitudinal viens brownish, the periphery touched with whitish.

MEASUREMENTS:

Length of body (exclusive of ovipositor) .	41. mm.
Length of pronotum	8.5 mm.
Length of tegmina	43. mm.
Length of hind femora	27. mm.
Length of ovipositor	19. mm.

Euscris richmondi† n. sp.

Type: male; Escondido River, fifty miles from Bluefields, Nicaragua. July 13th. Collected by C. W. Richmond (U. S. N. M.)

* Southwest from Panama City several hundred miles.

† Dedicated to Dr. C. W. Richmond, Assistant Curator of the Department of Birds in the United States National Museum, who collected the type while in the Bluefields country.

Allied to *E. pictipennis* Saussure and Pictet,* but possessing many very distinctive characters. The median and discoidal veins of the tegmina are centrally almost contiguous; the anterior border of the pronotum is without a thickened margin; the basal section of the subgenital plate is as broad as long, with the carina basally indistinct, and the styles are heavier.

Size large; general build very slender; head, limbs and antennæ pilose. Head broad, facial region very much flattened; eyes subglobose, considerably exserted; antennæ very long, over twice as long as the tegmina with pronotum and head. Pronotum strongly tuberculate; anterior margin broadly obtuse-angulate, posterior arcuate; lateral lobes about twice as long as high, the lower margin thickened, tuberculate, sinuate; posterior sulcus strongly impressed; lateral angle on the metazona marked. Tegmina elongate, about six times as long as wide; median and discoidal veins quite distinct distally and proximally but centrally almost contiguous, the general arrangement of transverse veins forming quadrate or rectangular patterns. Wings very large, about reaching the apex of the tegmina. Anterior and median femora slender, sulcate beneath, bearing six or seven spines on the lower external margins, genicular lobes spinose; tibiæ very slender, quadrate, lower margins spined as is also the case with upper internal margins of the median pair. Posterior femora slender, bearing fourteen or fifteen large spines on the external margin, the basal portion of which is unarmed; tibiæ quadrate, spined on the margins. Subgenital plate basally broad, keeled, the lateral margins bent upwards, the terminal portion bent sharply upwards and bearing the "four leaf clover" appendage characteristic of the genus. Styles robust, rounded and not angulate, the apical portion of each suddenly constricted.

General color uniform dull brownish yellow (specimen probably having been at some time in a liquid preservative). Wings with the disk dull grayish brown, the anterior field and periphery of the general tint.

MEASUREMENTS:

Length of body	36. mm.
Length of pronotum	9. mm.
Length of tegmina	54. mm.
Length of posterior femora	35.5 mm.
Length of posterior tibiæ	39. mm.

Scopiorus brevifolius Brunner.

1895, *Scopiorus brevifolius* Brunner, Monographie der Pseudophylliden, p. 236.

Nine specimens; four males, five females; Mexico. Coll. Acad. Nat. Sci. Phila. (1). Teocelo, Vera Cruz, Mexico. Collected by Otis W. Barrett (3). Jalapa, Vera Cruz, Mexico. August and September. Collected by Otis W. Barrett (5).†

In one of the males the apex of the subgenital plate is not emarginate, as in the specimen from Orizaba, described by Saussure and Pictet,‡ the other three having the apex broadly emarginate.

* Biol. Cent.-Amer., Orthopt., i, p. 441, tab. 21, figs. 3-8.

† Additional information with these specimens is to the effect that they were taken on Palmetto (*Sabal* sp.).

‡ Biol. Cent.-Amer., Orthopt., i, 444.

Mimetica marmorata Saussure and Pictet

1898, *Mimetica marmorata* Saussure and Pictet, Biol. Cent.-Amer., Orthopt., i, p. 453, tab. xxii, figs 10 and 11.

Two males; Nicaragua (U. S. N. M. . Escondido River, fifty miles from Bluefields, Nicaragua. July 13th. Collected by C. W. Richmond (U. S. N. M.).

Family GRYLLIDÆ.

Gryllotalpa hexadactyla Perty.

1830, *Gryllotalpa hexadactyla* Perty, Del. Anim. Artic. Bras., p. 119, tab. 23, fig. 9.

Three females; Panama (U. S. N. M.). Escondido River, fifty miles from Bluefields, Nicaragua. August 25, 1892. Collected by C. W. Richmond (U. S. N. M.).

Scapteriscus didactylus (Latreille).

1804, *Gryllotalpa didactyla* Latreille, Hist. Nat. Crust. et Ins., xii. p. 122.

Two specimens; male and female; Machuca, Nicaragua. Coll. Acad. Nat. Sci. Phila.

Scapteriscus sp.

One immature specimen; Panama (U. S. N. M.).

Tridactylus histrio Saussure.

1896, *Tridactylus* (*Heteropus*) *histrio* Saussuse, Biol. Cent.-Amer., Orthopt., i, p. 207.

Two males; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Rhipipteryx pulicaria Saussure.

1896, *Rhipipteryx pulicaria* Saussure, Biol. Cent.-Amer., Orthopt., i, p. 215.

Ten specimens; six males, four females; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Rhipipteryx fraterna Saussure.

1896, *R*[*hipipteryx*] *fraterna* Saussure, Biol. Cent.-Amer., Orthopt., i, p. 214.

Six specimens; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett (3). Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (3).

Anurogryllus muticus (De Geer).

1773, *Gryllus muticus* De Geer, Mém. Ins., iii, p. 520, tab. 43, fig. 2.

One male; Panama. Dr. LeConte. Coll. Acad. Nat. Sci. Phila.

Gryllus pennsylvanicus Burmeister.

1838, *Gr[yllus] pennsylvanicus* Burmeister, Handb. der Ent., ii, p. 734.

Two specimens; male and female; Mexico, Coll. Acad. Nat. Sci. Phila.

I have followed Scudder* in considering *neglectus* a synonym of *pennsylvanicus*.

Gryllus assimilis Fabricius.

1775, *Gryllus assimilis* Fabricius, Syst. Ent., p. 280.

Two specimens; male and female; Teocelo, Vera Cruz, Mexico. September. Collected by Otis W. Barrett. Jalapa, Vera Cruz, Mexico.

Gryllus barretti Rehn.

1901, *Gryllus barretti* Rehn, Trans. Amer. Ent. Soc., xxvii, p. 221.

Two specimens; male and female; Yucatan. Schott. Coll. Acad. Nat. Sci. Phila.

Gryllus mexicanus Saussure.

1874, *Gryllus mexicanus* Saussure, Miss. Scient. Mex., Orthopt., p. 402, tab. 8, fig. 30.

Two specimens; male and female; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Gryllodes toltecus Saussure.

1877, *Gryllodes toltecus* Saussure, Mélanges Orthoptérologiques, 5e fasc., p. 396.

Two immature specimens; male and female; Ticul, Yucatan. Coll. Acad. Nat. Sci. Philadelphia.

Anaxipha sp.

Two males; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Heterogryllus cellaris Saussure.

1874, *Heterogryllus cellaris* Saussure, Miss. Scient. Mex., Orthopt., p. 440.

One male; Machuca, Nicaragua. Coll. Acad. Nat. Sci., Phila.

As only females of this species were previously known, and this specimen, while showing considerable difference from the descriptions, exhibits nothing which I can consider of more than sexual mportance, I have placed under this species previously known only from Brazil.

* Psyche, ix, p. 292.

Amphiacusta tolteca Saussure.

1897, *Amphiacustes tolteca* Saussure, Biol. Cent.-Amer., Orthopt., i, 247.

One female; Mexico. Coll. Acad. Nat. Sci. Phila.

Amphiacusta azteca (Saussure).

1859, *Ph[alangopsis] aztecus* Saussure, Revue et Magas. de Zoolog., 2e ser., xi, p. 209.

One female; Jalapa, Mexico. Coll. Acad. Nat. Sci. Phila.

Xabea bipunctata (De Geer).

1773, *Gryllus bipunctata* De Geer, Mém. Ins., iii, p. 523, pl. 43, fig. 7.

One female; Teocelo, Very Cruz, Mexico. September. Collected by Otis W. Barrett.

Œcanthus varicornis Walker.

1869, *Œcanthus varicornis* Walker, Catal. Derm. Salt. Brit. Mus., i, p 94.

One immature male; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Parœcanthus olmecus Saussure.

1897, *Parœcanthus olmecus* Saussure, Biol. Cent.-Amer., Orthopt., i, p. 264, tab. xiii, figs. 16 and 17.

Two specimens; male and female; Orizaba, Vera Cruz, Mexico. January 9–16, 1892. Collected by H. Osborn (U. S. N. M.).

Aphonogryllus diversus (Walker).†

1871, *Platydactylus diversus* Walker, Catal. Derm. Salt. Brit. Mus., v, Suppl., p. 12.

One female; Machuca, Nicaragua. Coll. Acad. Nat. Sci. Phila.

† For use of this generic name in place of *Aphonus* Saussure, see Rehn. Canad. Ent., xxxiii, p. 272.

A LIST OF THE INSECTS OF BEULAH, NEW MEXICO.

EDITED BY HENRY SKINNER.

In the summer of 1901 I determined to go to the Rocky Mountains on a collecting expedition and vacation, and was influenced to select Beulah, New Mexico, from the fact that Prof. T. D. A. Cockerell had taken *Argynnis nitocris* there. The country was represented to me as interesting from a scenic standpoint and also a good place entomologically.

Beulah is situated in Sapello canon in the main range of the Rocky Mountains, about thirty miles north-west of Las Vegas in San Miguel County, New Mexico. The elevation of Beulah Post Office (Barker's ranch) is about 7,250 feet. My headquarters was at Blake's ranch, 8,000 feet elevation. The fauna and flora here are those of the Canadian zone. The Sapello river runs through the canon and at Beulah is a small but swiftly running creek.

I arrived on the morning of August, the 9th, and left on August, the 26th, thus having sixteen days collecting. Rain fell every day but one during my stay. The thunder storms of the rainy season usually commenced in the afternoon, and unfortunately left everything wet for some time on the mornings following. It was generally ten A. M. before the vegetation was dry enough to permit fair collecting. However, by hard work I managed to get a considerable number of insects of all orders. Coleoptera were comparatively scarce, as were also the night-flying moths, and very few of the latter were taken at night. The best night catch of moths was made during a rain storm. No sugaring was attempted. Vegetation is prolific, and the timber line is well toward the top of the main range (11,000 feet). During the month of August the nights and mornings are quite cool and fire is necessary for comfort.

When I returned to Philadelphia and mounted the material collected, I turned it over to various specialists for study and determination, and feel very grateful to the entomological friends who have so kindly aided me. I am specially indebted to Prof. T. D. A. Cockerell, who generously placed in my hands all his valuable records. In addition to his own collecting he also includes the material captured by Willmatte Porter (now Mrs. Cockerell), and his late son, Martin D. Cockerell. This material he had determined by students

of the various orders. I wish to mention the kindness and courtesy shown me by Col. F. A. Blake and his family, and also Mr. Barker.

There are other lists that the student may consult with profit in conjunction with this. They are are as follows:

Lists of the Lepidoptera and Coleoptera Collected in New Mexico. By F. H. Snow.

Trans. Kansas Academy of Science, viii, 35, 1883.

The Entomology of the Mid-Alpine Zone of Custer County, Colorado. By T. D. A. Cockerell, Trans. Amer. Ent. Soc., xx, 305, 1893.

Insects of the Hudsonian Zone, Psyche. vol. ix.

A first List of the Orthoptera of New Mexico. By Scudder and Cockerell, Proc. Davenport Acad. Sciences, ix, 1902.

Some additional records have been entered from material collected by Mr. Henry L. Viereck on the 29th and 30th of June of this year.*

Unless otherwise stated the first letter after a species indicates the name of the determiner, and the following letter or letters indicate the collector.

LEPIDOPTERA OF BEULAH, NEW MEXICO.

BY HENRY SKINNER.

RHOPALOCERA.

Argynnis nitocris *var.* nigrocærulea *Ckll.*†
nausicaa *Edw.*
aphrodite *var.* cypris *Edw.*
atlantis *var.* electa *Edw.*
Melitæa nubigena *Bahr.*
Phyciodes tharos *Drury.*
Grapta faunus *Edw.*
Grapta comma *Harr.*
Vanessa antiopa *Linn.*
milberti *Godt.*
Pyrameis cardui *Linn.*
atalanta *Linn.*
Limenitis weidemeyeri.
Satyrus charon *Edw.*
Lemonias nais *Edw.*

* 1902.

† *Argynnis nitocris* was described from a single male, by Mr. W. H. Edwards in 1874. It was taken in the White Mountains of northeast Arizona. The female was described by the same author in the Can. Ent. in 1883. A few females have been taken in Colorado and Nevada. Strecker described a female from the Rio Florida, S. W. Colorado, in 1883, under the name aberration *nokomis*. In 1900 Prof. Cockerell found a variety of the species at Beulah which he named *nigrocærulea*. This species has been one of the great rarities in collections, and it is probably due to the fact of its late flight and very local habitat. It was abundant after the middle of August below Barker's ranch (7200 ft.), but I did not see a single specimen in the canon above this place. Their headquarters seemed to be between Barker's saw-mill and Heinlen's ranch. Their flight is swift and the species is wary, but is readily taken if approached carefully while it is feeding on the flowers of a tall sunflower which grows rather abundantly at this place in the

Thecla crysalus *Edw.*
titus *Fab.*
calanus *Hbn.*
Lycæna rustica *Edw.*
melissa *Edw.*
comyntas *Godt.*
Neophasia menapia *Feld.*
Pieris occidentalis *Reak.*
napi *Linn.*
Nathalis iole *Bd.*
Anthocharis ausonides *Bd.*
Colias cæsonia *Stoll.*
eurytheme *Bd.*
alexandra *Edw.*
Pamphila comma *var.*
sylvanoides *Bd.*
snowi *Edw.*
Pholisora pirus *Edw.*

HETEROCERA.

ABBREVIATIONS.

The first letter after a species denotes the determiner, and the next letter or letters the collector.

Sm.—Smith, J. B.
B. Beutenmuller, W.
S.—Skinner, H.
C.—Cockerell, T. D. A.
D.—Dyar, H. G.

Deilephila lineata *Fabr.* S., S.
Bembecia marginata *Harr.* B., C.
Alypia lorquini *G. and R.* S., S.
Gnophæla vermiculata *G. and R.* S., S.
clappiana *Holl.* S. S.
Crambidia casta *Sasb.* D., C.
Crocota brevicornis *Walk.* S., S.
quinaria *Grt.* D., C.
Plataractia hyperborea *Curt.* S., S.
Arctia determinata *Neum.* S., S.
Clisiocampa fragilis *Stretch.* C., C.
Peridromia sancia *Hbn.* S., S.
astricta *Morr.* S. S.
Noctua baja smithii, *Snell.* S., S.
clandestina *Harr.* S., S.
Feltia tricosa *Lint.* S., S.
circumdata *Grt.* S., S.
herilis *Grt.* S., S.

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canon. Most of the females were taken in a damp meadow near some old buildings below the saw-mill. Violets grow in profusion in this meadow. The males when not feeding on the sunflowers were seen "dipping" over the meadow in search of the freshly emerged females.

This habit of flight, which I call dipping, seems to be peculiar to the males of certain species of *Argynnis* while in search of the females hiding in long meadow grass. This is the only species in the genus, as far as I have observed, that seems partial to sunflowers. During my stay I took about one hundred specimens and could have obtained many more. Mrs. Cockerell succeeded in obtaining eggs of the species. I have received the variety *cærulescens* described by Dr. Holland from Mexican specimens, from the Santa Catalina Mountains in southern Arizona. *Nitocris* is a fine species and its varieties are handsome, and doubtless other forms of the species will be found when the high mountain valleys of the Southwest are better known. The species is found as late as the middle of September; Dr. Holland's variety having been taken in the Piedras Verdes (7100 to 7300 ft.) in Chihuahua, Mexico, September 15th.

Carneades insignata *Walk.* Sm., S.
ridingsiana *Grt.* S., S.
insulsa *Walk.* S., S.
gagates *Grt.* Sm., C.
Xylophasia suffusca *Morr.* Sm., C.
Mamestra olivacea *Morr.* S., S.
determinata *Sm.* S., Sm.
renigera *Steph.*
imbrifera *Gn.*
Pseudanarta flavidens *Grt.*
Oncocnemis colorado Smith. Sm., C.
Nephelodes minians *Gn.*
Hydroecia atlantica *Smith.* Sm., S.
velata *Walk.* Sm. S.
juvenilis *Grt.* Sm. S.
Leucania pallens *Linn.* S., S.
albilinea *Hbn.* S., S.
Orthodes virgula *Grt.* Sm., C.
Ingura sp.
Plusia bimaculata *Steph.* S., S.
celsa *Hy. Edw.* S., S.
alticola *Walk.* S., S.
brassicæ *Riley.* S., S.
Grotella dis *Grt.* Sm., S.
Pseudanthœcia tumida *Grt.* S., S.
Sicya macularia *Harr.* S. S.
Lychnosea helveolaria *Hulst.* S. S.
Triphosa dubitata *Linn.* S., S.
Emplocia fervifactaria *Grt.* S., S.
Loxostege cereralis *Zell.* S., S.
Ethmia discostigella *Ch.* D., C.
Epithecthis bicostomaculella *Chamb.* D., C.
Gelechia versutella, *Zeller.* D., C.
Argyresthiæ gœdartella *Linn.* D., C.

COLEOPTERA.

BY HENRY SKINNER.

ABBREVIATIONS.

The first letter after a species denotes the determiner, and the next letter or letters the collector.

S.—Skinner, H.
D.—Van Dyke, E. C.
F.—Fall, H. C.
W.—Wickham, H. F.
H.—Hopkins, A. D.
C.—Cockerell, T. D. A.
W. P.—Wilmatte Porter.
W. P. C.—Wilmatte Porter Cockerell.

CICINDELIDÆ.

Cicindela longilabris *Say.* S., S.
var. cimarrona *Lec.* S., S.
var. micans *Fab.* S., S.
var. oregona *Lec.* S., S.

CARABIDÆ.

Cychrus elevatus *Fab.* var. S., S.
Carabus tædatus *Fab.* S., S.
Calasoma obsoletum *Say.* S., S.
Bembidium lucidum *Lec.* D., S.
mutatum *G.* and *H.* D., S.
quadrimaculatum *Linn.* D., S.
Tachys nanus *Gyll.* S., S.
Pterostichus longulus *Lec.* S., S.
substriatus *Lec.* D. S.
luczotii *Dej.* D., S.
femoralis *Kirby.* F., C.*

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* May 3rd.

Amara jacobinæ *Lec.* D., S.
polita *Lec.* D., S.
interstitialis *Dej.* D., S.
Platynus nivalis *Horn.* S., S.
placidus *Say.* D., S.
Lebia viridis *Say.* S., S.
divisa *Lec.* W., C.
Metablethus americanus *Dej.* F., C.*
Cymindis cribricollis *Dej.* S., S.
Harpalus retractus *Lec.* S., S.
fallax *Lec.* S., S.
somnulentus *Dej.* S., S.
ellipsis *Lec.* S., S.
funestus *Lec.* S., S.
Stenolophus conjunctus *Say.* F., C.*

HYDROPHILIDÆ.

Hydræna punctata *Lec.* F., S.
Laccobius agilis *Rand.* F., C.†
Hydrobius scabrosus *Horn.* S., S.

SILPHIDÆ.

Silpha lapponica *Hbst.* S., S.
Hydnobius substriatus *Lec.* F., S.
Anistoma punctatostriata *Kirby.* F., S.

PSELAPHIDÆ.

Tyrus corticinus *Cas.* Wenzel, S.
Articerus fuchsi *Brend.* F., C.†

STAPHYLINIDÆ.

Falagria dissecta *Er.* F., C.†
Quedius molochinus *Grav.* F., C.†
Sunius longiusculus *Mann.* F., C.*
Xantholinus cephalus *Say.* F., S.
Stenus trajectus *Csy?** F., C.
juno *Fab.* F., C.†
Tachinus repandus *Horn.* F., S.
Geodromicus oripennis *Lec.* F., S.
Tachyporus maculipennis *Lec.* F., C.†
jocosus *Say.* F., C.†
brunneus *Fab.* F., C.†
Oxytelus suspectus *Csy.* F., C.†
alpicola *Csy.* F., C.†
Apocellus sphæricollis *Say.* F., C.†

PHALACRIDÆ.

Olibrus pallipes *Say.* F., S.

COCCINELLIDÆ.

Hippodamia convergens *Guer.* S., S.
parenthesis *Say.* F., C.*
falcigera *Cr.* S., S.
Cocinella trifasciata *Linn.* S., S.
Anatis lecontei *Cas.* F., C.
Exochomus æthiops *Bland.* F., C.
Hyperaspis fimbriolata *Melsh.* S., S.
Scymnus ardelis *Horn.* F., C.

ENDOMYCHIDÆ.

Aphorista morosa *Lec.* F., C. (Harvey's Ranch).
Lycoperdina ferruginea *Lec.* S., S.

EROTYLIDÆ.

Erotylus boisduvallii *Chev.* S., S.

COLYDIIDÆ.

Bothrideres montanus *Horn.* S. S.

CUCUJIDÆ.

Silvanus advena *Waltl.* S., S.

CRYPTOPHAGIDÆ.

Antherophagus pallidiventris *Csy.* F., S.

MYCETOPHAGIDÆ.

Mycetophagus confusus *Horn.* F., W. P. C.

DERMESTIDÆ.

Orphilus glabratus *Fab.* F., C. (July 17).

HISTERIDÆ.

Hister punctiger *Lec.* S., S.
Plegaderus sayi *Mars.* F., C.

NITIDULIDÆ.

Carpophilus zuni *Csy.* F. C.
Epuræa integra *Horn.* F., W. P. C.
popagona *Csy.?* S., S.
adumbrata *Mann.?* F., C.
Nitidula ziczac *Say.* S., S.
Meligethes mutatus *Har.* S., S.

PARNIDÆ.

Dryops striatus *Lec.* S., S.

* May 3rd. † Miss Mary Cooper, May 15th.

ELATERIDÆ.

Dolopius lateralis *Esch.* F., C.*
Athous cribratus *Lec.* F., C. (July 17).

BUPRESTIDÆ.

Buprestis *var.* rusticorum *Kby.* F., C.
var. langii *Mann.* F., C.
Chrysobothris ludificata *Horn.* S., S.
Acmæodera sparsa *Horn.* F., W. C.
Agrilus politus *Say.* W. C.

LAMPYRIDÆ.

Rhyncheros sanguinipennis *Say.* S., S.
Eros aurora *Hbst.* F., C.*
Plateros sollicitus *Lec.* S., S.
Calochromus perfaceta *Say.* S., S.
ruficollis *Lec.* W., C.
Podabrus lateralis *Lec.* F., W. P. C.
Silis difficilis *Lec.* F., C.*

CLERIDÆ.

Trichodes ornatus *Lec.* S., S.
var. tenellus *Kby.* F., C.
Clerus nigriventris *Lec.* S., S.
Thanasimus undulatus *Say.* F., C.
Hydnocera pubescens *Say.* S., S.
Necrobia rufipes *Fab.* S., S.

PTINIDÆ.

Dinoderus substriatus *Payk.* S., S.

LUCANIDÆ.

Platycerus depressus *Lec.* W., C.

SCARABÆIDÆ.

Aphodius cruentatus *Lec.* S., S.
Trichius affinis *Gory.* S., S.

CERAMBYCIDÆ.

Tetropuim cinnamopterum *Kby.* S., S.
Batyle suturalis *Say.* S., S.
Pachyta liturata *Kby.* S., S.
Acmæops proteus *Kby.* W., C.
pratensis *Laich.* S., S.
Leptura propinqua *Bland.* S., S.
var. cribripennis *Lec.* F., W. P.
chrysocoma *Kby.* S., S.
Monohammus maculosis *Hald.* S., S.
Acanthocinus obliquus *Lec.* S., S.
spectabilis *Lec.* S., S.

CHRYSOMELIDÆ.

Zeugophora abnormis *Lec.* S., S.
Babia *var.* tetraspilota *Lec.* S., S.
Cryptocephalus 4-maculatus *Say.* W., C. (July 25).
quadruplex *Newm.* S., S.
Pachybrachys lustrans *Lec.* F., C.
atomarius *Melsh.* S., S.
Xanthonia 10-notata *Say.* F., S.
Adoxus vitis *Linn.* F., C.
Chrysomela continua *Lec.* S., S.
sigmoidea *Lec.* S., S.
Plagiodera viridis *Melsh.* S., S.
Luperodes morrisoni *Jac.?* F., C.
Trirhabda attenuata *Say.* S., S.
convergens *Lec.* F., C.
Monoxia debilis *Lec.* S., S.
Œdionychis triangularis S., S.
lugens *Lec.?* S., S.
Haltica punctipennis *Lec.* S., S.
Glyptina brunnea *Horn.* F., C.*
Phyllotreta pusilla *Horn.* F., C.*
Chætocnema protensa *Lec.* F., S.
Dibolia ærea *Melsh.* F., C.*
Psylliodes punctulata *Melsh.* S., S.

TENEBRIONIDÆ.

Asida opaca *Say.* S., S.
Eleodes tricostata *Say.* S., S.
humeralis *Lec.* S., S.
extricata *Say.* S., S.
lecontei *Horn.* S., S.
Tenebrio obscurus *Fab.* F., C.
Blapstinus sp.

ŒDEMERIDÆ.

Ditylus obscurus *Lec.* S., S.
Asclera puncticollis *Say.* S., S.

MORDELLIDÆ.

Anaspis atra *Lec.* F., S.

MELOIDÆ.

Macrobasis unicolor *Kby.* S., S.
Cantharis nuttalli *Say.* S., S.

* May 3rd.

RHYNCHITIDÆ.

Rhynchites bicolor *Fab.* S., S.

OTIORHYNCHIDÆ.

Thricolepis inornata *Horn.* F., C.

CURCULIONIDÆ.

Sitones sp.
Apion sp.
Stephanocleonus plumbeus *Lec.* F., C.
Otidocephalus estratus *Cky.* F., S.
Anthonomus decipiens *Lec.* F., S.
Tyloderma baridium *Lec.* F., C.
Ceutorhynchus pusio *Mann.* F., S.

CALANDRIDÆ.

Cossonus subareatus *Boh.?* F., C.
concinnus *Boh.* S., S.

SCOLYTIDÆ.

Gnatatrichius sulcatus. H., S.
Tomicus calligraphus *Germ.* H., S.
plastographus *Lec.* H., S.
rectus *Lec.* H., S.
Hylastes n. sp. H., S.
n. sp. H., S.
Hylurgops subcostulatus *Mann.* H., S.
Scolytus præceps *Lec.* H., S.
Dendroctonus valens H., S.
Polygraphus rufipennis *Kby.* H., S.

ORTHOPTERA.

BY J. A. G. REHN.

PHASMIDÆ.

Diapheromera sp.

One immature female; August 17, 1901.

ACRIDIDÆ.

Stenobothrus curtipennis (Harris).

One male; August 17, 1901.

This species has previously been recorded from Utah Co., Utah, and several localities in Colorado (altitudes 5,000–8,500 feet), the most southern being Garland, Costillo County.

Arphia arcta Scudder.

One female; August 17, 1901.

Camnula pellucida (Scudder).

Six specimens, four males, two females; August 17, 1901.

Dissosteira carolina (Linnæus).

One male; August 17, 1901.

Circotettix suffusus (Scudder).

One male; August 17, 1901.

Previous reports included the following Colorado records: Manitou 6,300 feet, Florrisant 8,000 feet, Alma 10,000 feet, and North Fork of South Platte River.

Melanoplus bivittatus (Say).

Ten specimens, three males, five females, two immature specimens; August 17, 1901; Denver, Colorado, August 26, 1901.

TETTIGONIDÆ.

Scudderia furcata Brunner.

One male; August 17, 1901.

Orchelimum sp.

Three specimens, one male, two females; August 17, 1901.

Ceuthophilus uniformis Scudder.

Two males; August 17, 1901.

Previous records from this general region: Plains of Northern New Mexico (eastern slope), Beaver Brook, Colorado (6,000 feet), and Manitou, Colorado (6,300 feet).

Additional Orthoptera determined by S. H. Scudder and collected by T. D. A. Cockerell, W. P. Cockerell and M. D. Cockerell.

Melanoplus cockerelli. C.
bruneri. C.
gillettei. W. P. C.
Ceuthophilus valgus. C.
Bacillis coloradus. W. P. C.
Anabrus coloradus. W. P. C.
Melanoplus bivittatus. M. D. C.

NEUROPTERA—Odonata.

BY P. P. CALVERT.

Argia sp. (new?)

1 ♀, allied to *mœsta* Hag. and *violacea* Hag.

Lestes disjunctus Selys.

4 ♂, 2 ♀. Ranges from Nova Scotia to Washington, and in the West south through Colorado.

Enallagma calverti Morse.

6 ♂. A male was taken by Prof. Cockerell at Top Range, N. Mex., 11,000 feet, on June 29. This species is known from Maine, Massachusetts and Indiana in the East. In the West it ranges from Alaska and Washington to New Mexico.

Ischnura verticalis Say.

1 ♂. Differs from typical Eastern examples by the lateral basal black stripe on 8 being reduced to a very small spot. Quebec to Georgia, west to Missouri and Louisiana.

Æschna clepsydra Say.

1 ♂. Eastern N. Amer. from Labrador to Maryland and Illinois; Dakota, Saskatchewan, Alaska; Irkutsk, Siberia; Finland.

Æschna multicolor Hag.

1 ♂. Indiana? Dakota to Pacific-Mexico and Brit. Columbia.

Ophiogomphus severus Hag.

1 ♂, 2 ♀. Previously known from New Mexico, ranging north to Washington.

Sympetrum corruptum Hag.

1 ♀. Illinois to California, Montana to Mexico; Ochotsk. Pennsylvania, New York, N. Jersey.

Neuropteroid Insects.

Raphidia bicolor Alb.

Det. by N. Banks. Coll. by T. D. A. Cockerell. August 13.

Micromus montanus Hag.

Det. by N. Banks. Coll. by T. D. A. Cockerell. August 16.

Chrysopa oculata Say.

Det. by N. Banks. Coll. by T. D. A. Cockerell. July 25.

Tomocerus niger Bourl., *var.* **americanus** Schott.

Det. by J. W. Folsom. Coll. by T. D. A. Cockerell. It is also found in Alaska, California and Oregon (Folsom).

HYMENOPTERA of Beulah, New Mexico.

BY HENRY L. VIERECK.

Unless otherwise mentioned, the collector is Dr. Henry Skinner. The species preceded by * are taken in their entirety from Prof. Cockerell's published records. I wish to heartily thank Prof. Cockerell for his active interest and liberal aid in the preparation of this paper.

APOIDEA.

APIDÆ.

***Apis mellifera** L.

"Only arrived at Beulah two or three years ago."

BOMBIDÆ.

Bombus fervidus Fabr.

One ♂.

Bombus ternarius Say, *var.* **bifarius** Cress.

One ♀. By the wider band of black pubescence on dorsulum, continued back on scutellum where it divides the yellow, the black pubescence at base of second abdominal segment and brownish hairs on tibiæ, this resembles *bifarius*. One ☿ on flowers of *Jamesia americana* June 30, 1902 (Viereck).

***Bombus ternarius** Say.

May 30, at *Iris missouriensis* and wild plum flowers; August 10–18 (W. P. Cockerell). "Not so abundant as *juxtus*."

Bombus juxtus Cress.

Three ☿ ☿. May 30, at *Iris missouriensis* and wild plum; August 16–23 (W. P. Cockerell). "A very abundant species at 8,000 9,000 feet" (T. D. A. Cockerell).

Bombus appositus Cress.

One ♀. June 29, 1902 (Viereck); August 16, at *Polemonium cœruleum* (W. Porter). This specimen varies from the type in the lighter color of all the pale pubescence, that of the abdomen being of a lemon color compared with the ochraceous color in the type from Colorado. August 16, at *Polemonium cœruleum*, rather common (W. P. Cockerell).

Bombus consimilis Cress.

One ♀. June 29, 1902 (Viereck). This is apparently a species new to New Mexico. In the type the abdomen has ochraceous pubescence on first two segments, the rest black. The specimen here recorded has the pale pubescence on first segment very sparse, the segment almost bare as though the hair were rubbed off, in fact the hairs that do exist on the middle of the segment are largely black, the yellowish ones only prominent at the sides of the segment

where they form the ends of a curved band of rather sparce yellow hairs, which line the anterior portion of the second abdominal segment. There is a yellow band of hair on the fourth segment and some yellow hairs on the extreme sides of the fifth segment, fifth and sixth with black hairs. In the abdominal arrangement of pubescence it agrees more with a specimen in the Society's collection marked "Canada," but that has the ochreous pubescence on first and second abdominal segments very abundant. The hairs on the thorax are slightly paler than in the type.

Bombus nevadensis Cress.

One ♀.

***Bombus nevadensis,** *race* **aztecus** Ckll.

May 30, at *Verbena bipinnatifida* (W. P. Cockerell).

***Bombus iridis** Ckll.

Type locality, Beaulah, May 30, 1899, at flowers of *Iris missouriensis* (W. P. Cockerell).

***Bombus howardi** Cress.

May 30, August 16, rather common (W. P. Cockerell).

***Bombus rufocinctus** Cress.

August 25, ♂ and hill near Beulah, August 23, ♂ (W. P. Cockerell).

***Bombus prunellæ** Ckll.

Type locally in part. One ♀, May 30, two ☿, August 18 (W. P. Cockerell).

***Bombus proximus** Cress.

***Bombus monardæ** C. and P.

July 18, 1900, at flowers of *Rudbeckia*.

PSITHYRIDÆ.

Psithyrus insularis Sm.

Two ♂♂, one ♀. One ♂ W, of Beulah, August 23 (W. P. Cockerell). The ♀, July 18 (T. D. A. Cockerell).

ANTHOPHORIDÆ.

Clisodon terminalis Cress.

One ♂. (H. Skinner.) August 18, at flowers of *Polemonium*. Also Sapello Canon, August 31 (W. P. Cockerell). Two ♀ ♀, June 30, 1902, (Viereck), Crew's Mesa just above Beulah, same zone, June 29, 1902 (B. Chapman).

Melissodes confusa Cress.

Two ♂. August 12, 1900, at flowers of *Erigeron* (T. D. A. Cockerell). One specimen has the pubescence paler than in the types from Colorado, the other is normal. Males of this species range from 8 to 12 mm. in length. One ♂, July (W. P. Cockerell). One ♂, July 11, 1902, on Helianthoid compositæ (W. P. Cockerell).

Anthophora nubiterræ n. sp.—First joint of flagellum a little longer than second and third joints united. Apical abdominal plate broadly emarginate Related to *A.* syringæ Ckll.

♂ Length 10 mm. Frontal foveæ indistinctly punctured, front and vertex opaque, roughened, clypeus and lateral areas coarsely almost confluently punctured, labrum with shallow poorly defined separated punctures, depressed in the middle. Cheeks partly shining, finely roughened. Thorax almost uniformly sculptured like cheeks but duller. Dorsulum with a fine central line running back to the middle where the mesonotum is shining. A shining longitudinal line about two millimeters in length in the middle of each side. Tarsal claws long, cleft down from the apex for about one-fourth the length of the claw. Wings hyaline, costal and radial nervure dark brown, the other nervures slightly paler, wing textures brownish along the nervures. Second submarginal cell narrowed about one-half on the radius. Abdomen subopaque, finely indistinctly sculptured, margins of segments testaceous. Head, thorax, abdomen, coxæ and femora with pale pubescence, that of dorsulum brownish. Anterior tibiæ partly bare, median tibiæ with white appressed pubescence and a patch of brownish pubescence. Posterior tibiæ like median one externally, the inner surface with a deep brown pubescence. Tarsi with whitish pubescence externally, bright brown internally.

Black. Clypeus yellow, small dot at base of scape, supraclypeal emarginate band and V shaped lateral marks more ochreous, labrum lemon yellow, notched at sides and apex with black. Smaller tarsal joints pale brownish.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., (W. P. Cockerell). One ♂.

***Anthophora bomboides,** *var.* **neomexicana** Ckll.

May 30. 1 ♀ (W. Porter).

NOMADIDÆ.

Epeolus occidentalis Ckll.

Length, 8mm. Besides the small size, the specimen has the follow-

ing peculiarities: Antennæ and anterior femora black. First and second transverse cubiti meeting on the radial nervure. One ♂.

Nomada zebrata Cress.

♀. This specimen is more conspicuously colored than the type, and has the following pattern: Greater part of head above insertion of antennæ, median belt on the dorsulum, narrow before, as broad as the scutellum behind, the metathoracic enclosure entirely and belt from wing insertion to posterior and median coxæ black. Antennæ above from honey yellow to subfuscous, beneath subfuscous on the basal half, black on the apical half with exception of the terminal joint, which is orange color. Maxillary palpi five jointed. Transverse medial nervure interstitial with the basal nervure. One specimen.

MEGACHILIDÆ.

Trypetes carinatum Cress.

One ♀. August 28, 1899 (W. P. Cockerell).

Ashmeadiella cactorum Ckll.

One ♀, August 18, (W. P. Cockerell). One ♀, June 29, 1902, (Viereck).

Ashmeadiella bucconis Say.

One ♀. August 10, on *Senecio douglasii* (W. P. Cockerell).

Osmia megacephala Cress.

One ♀, head Dailey Canon, June 26 (T. D. A. Cockerell).

***Osmia fulgida** Cress.

July 16, 1900 (W. P. and T. D. A. Cockerell).

***Osmia armaticeps** var. **capellonis** Ckll.

Hill above Beulah, August 19 (T. D. A. Cockerell).

***Osmia (Chalcosmia) facta** Cress.

May 30, at flowers of *Salix*, two ♂ (W. P. Cockerell). One ♂ (Helen Blake).

***Osmia (Chalcosmia) densa** Cress.

August 18. One ♀ (W. P. Cockerell).

***Osmia (Melanosmia) nigrifrons** var. **subaustralis** Ckll.

Beulah, type locally. July 26, one ♀ (W. P. Cockerell).

Osmia juxta Cress.

One ♀, June 29, 1902 (Viereck).

Osmia nigrifrons Cress.

Two ♀. June 29, 1902 (Viereck); one specimen has some white pubescence on the face, other is typical.

Monumetha borealis Cress.

One ♂, June 29 (Viereck).

Megachile sapellonis Ckll.

Megachile bucephala Cress., not of Sm. Syn. Hym., 1887, p. 302, ♀.
Megachile sapellonis Ckll., Ann. Nat. Hist., July, 1900, p. 7, ♀.

One ♀. Sapello Canon, July 26, two ♀, one at flowers of thistle (W. P. Cockerell). Two ♀, August 18 (T. D. A. Cockerell). Hill W. of Beulah (Crew's Mesa), August 23 (T. D. A. Cockerell). Two ♀, one ♂, June 29, 30, 1902 (Viereck).

Megachile relativa Cress.

One ♂. In addition to the characters given in the original description, the species has the distance between the posterior ocelli less than the distance between them and the nearest eye margin. This character at once seperates *relativa* from *brevis*. July 26, August 18 and 25, ♀ ♀, one at flowers of *Polemonium filicinum* (T. D. A. Cockerell). Another ♂ on *Salix*, May 30 (W. Porter).

Megachile pugnata Say.

Two ♀, hill near Beulah, August 19 (W. P. Cockerell). Three ♀, July 26 (W. P. Cockerell). Five ♀, two ♂, June 29, 30, 1902 (Viereck). One ♂ on Helianthoid compositæ July 11, 1902 (W. P. Cockerell).

Megachile vidua Sm.

Megachile monardarum Ckll., Ann. Nat. Hist., 1900, p. 11.

One ♀ with the pubescence white, examples from New Hampshire; Custer, South Dakota; Nevada and California almost agree in this respect, while others from Canada, Connecticut, New York, Pennsylvania and Deleware have a decided ochraceous tendency. This observation refers to ♀ ♀ alone, the ♂ ♂ appear to be more constant in the color of the pubescence.

Type locality in part of *monardarum*. Hill near Beulah, August 19 (W. P. Cockerell). Two ♂, one July 16, the other head of Dailey Canon, June 26 (T. D. A. Cockerell). One ♀, June 29, 1902

(Viereck). No specific difference has been noticed between authentic specimens of *monardarum* from Prof. Cockerell, and the specimens identified by Mr. Cresson as *vidua*, and which tally with Smith's description.

Megachile wootoni Ckll.

Two ♂, June 29, 1902 (Viereck). One ♀, John's Canon, above 10,000 feet. June 29, two ♂, head of Daily Canon, June 26 (T. D. A. Cockerell).

Megachile fidelis Cress.

July 26, one ♀, two ♀ on Helianthoid compositæ July 11, 1902 (W. P. Cockerell).

Megachile montivaga Cress.

Three ♂. June 29, 1902, on *Geum trifidum* and *Roripa nasturtium* (Viereck).

***Megachile fortis** Cress.

One ♀, end of August (T. D. A. Cockerell).

***Megachile pollicaris** *var.* **pereximia** Ckll.

Type locality May 30, at flowers of wild plum (W. P. Cockerell).

Anthidium occidentale Cress.

Two ♂. Three ♂, one ♀, Sapello Canon, August 31 (W. P. Cockerell). One ♀, June 30, 1902 (Viereck).

STELIDIDÆ.

Cœlioxys mœsta Cress.

End of August (T. D. A. Cockerell).

Cœlioxys alternata Say.

One ♂, June 29, 1902. This specimen has the lateral dorsal processes of the apical segment trifid.

PANURGIDÆ.

Halictoides (Parahalictoides) oryx n. sp.—♂ Length 6.5 mm.—Face and head rather closely and coarsely punctured, covered with long brownish hair, heavier on the front and clypeus than on the vertex and cheeks where it is sparser. Ocelli arranged on a curved line, space between the posterior pair a little less than that between them and nearest eye margin. Maxillary palpi six jointed, first joint about two-thirds the length of the second, the second about equal to

three, four and five united, sixth a little longer than fifth. Antennæ longer than the head and thorax, the sutures especially at base of flagellum indistinct. joints of flagellum nodose beneath, first joint of flagellum half the length of the second, terminal joint truncate, the end flat and shining. Dorsulum with well marked punctures, closer in front than behind, punctuation of scutellum similar to that of dorsulum, dorsulum with hair of the same kind and color as that on occiput, a fringe of hair bounding the scutellum similar to that on the front. Pleuræ sparsely pitted, shining, covered with sparse pale hair. Metathorax above longitudinally striato-punctate, the sides coriaceous, posterior face more shining with a central area. Metathorax covered with sparse pale hairs, the sides almost bare. Wings faintly clouded, transverse median nervure oblique practically interstitial with the basal nervure. First submarginal cell longer than the second. First recurrent nervure received by the second submarginal cell a little beyond the first transverse cubitus, the second recurrent nervure received the same distance before the second transverse cubitus, as the first is received beyond the first. Abdomen smooth and shining, indistinctly punctured, sparsely ciliate, segments two, three, four and five with a sparse fringe of brownish hairs, apical segments more thickly covered with longer brownish hairs. The borders of the segments somewhat testaceous, almost black, highly polished. Last ventral segment flattened not impressed basally, apical longitudinal keel abbreviated, almost obscured by the hairs.

Black. Head, dorsulum, scutellum and pleuræ somewhat steel color.

Type, Coll. Acad. Nat. Sciences Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One male specimen. This may prove to be the ♂ of *H. tinsleyi* Ckll. The antennæ put one in mind of the horns of the Oryx, hence the name. Two ♂. August 10–18 (T. D. A. Cockerell).

Halictoides marginatus Cress.

One ♀, August 28, 1899 (W. P. Cockerell).

Panurginus porteræ Ckll.

One ♀, July 24 (T. D. A. Cockerell). Both sexes on *Helenium hoopesii* Gray, the ♂ ♂ common. June 29, 30, 1902 (Viereck).

Panurginus verus Ckll.

♂.—Length 6.5 mm.—Very similar to the ♀. Yellow, all confined to the clypeus, a dot on apex of anterior pair of femora, a stripe on inner side of anterior pair of tibiæ and the basal joints of tarsi on four anteior legs yellowish. This is similar to *bakeri* in having yellow of face, confined to clypeus, but *bakeri* is a smaller species with punctures on clypeus closer and those on dorsulum finer.

Three ♀ ♀. Two others, one August 18th, another at hill above Beulah, August 15, 1900 (T. D. A. and W. P. Cockerell). One ♀

and four ♂ ♂, Crew's Mesa, at Beulah, same zone, June 29, 1902 (B. Chapman). Beulah, June 29, 1902, on *Helenium hoopesii* Gray (Viereck).

Panurginus atricomis Cress.

Two ♂ ♂.

Panurginus bakeri Ckll. ♂

Three males, agreeing with the description of *bakeri*, the sculpture of the metathorax is variable, the enclosure at best poorly defined, in two specimens not at all, the metathorax being uniformly rugulose. In one the lower angles of the face adjoining the clypeus bear a small yellow spot, in another there is a short yellowish line on anterior tibiæ. This species is closely related to *P. californicus* Cress., from which it differs in sculpture, stature and color, *bakeri* being black while *californicus* is more brownish. In *californicus* the punctuation on dorsulum is sparse and the metathorax has a smooth spot on each side. Among eight specimens (type and cotypes ♂) all but one has the clypeus entirely yellow, the individual with but a median spot is marked "*var.*," some have a small supraclypeal spot and one has well defined lateral face marks.

Panurginus nigrinus n. sp.—Related to *P. pauper* Cress., from which it differs in the coarser punctuation of face and dorsulum. Metathorax entirely opaque granular to finely rugulose, disk only slghtly impressed.

♀ Length 6 mm.—Face roughly punctured almost confluently, vertex with the punctures more distinctly separated, sculpture of cheeks indistinct, clypeus with large, close deep punctures. Labrum subtruncate anteriorly, concave, shining. Mesopleuræ rugulose. Dorsulum very closely punctured slightly impressed medially and anteriorly, scutellum punctured much the same. Metathorax opaque finely granularly rugulose. Wings hyaline, with a dark cast, stigma and nervures dark brown, first recurrent nervure received by the second submarginal cell about as far beyond the first transverse cubitus as the length of the first abcissa of the radius, second recurrent nervure received by the second cubital cell, a short distance before the second transverse cubitus. Base of first abdominal segment polished with very sparse minute punctures, the segments with the raised half indistinctly finely sculptured. Entire insect more or less covered with short whitish to yellowish pubescence.

Entirely black.

Type.--Coll. Acad. Nat. Sciences, Phila. Type locality.—Beulah, N. M., August 17, 1901 (H. Skinner) One ♀.

Two Colorado specimens belonging to this species were included under *pauper* in the original description, but they are constantly distinct in the characters pointed out.

Panurginus citrinifrons n. sp.—Clypeus with a longitudinal impressed line medially, dorsulum slightly impressed medially coarsely punctured, metathorax without a defined area.

♂ Length 6 mm.—Front closely rugulosely punctured, space between ocelli and eye margin with deep crude punctures, cheeks indistinctly punctured shining, clypeus, space above and aside sparsely deeply punctured, first joint of flagellum a little shorter than joints two and three united. Labrum shining concave, truncate, trapezoidal. Dorsulum with parapsidal grooves and deep, close, large punctures, mesopleurse punctured but not so strongly. Metathorax with the disk slightly impressed, entirely almost uniformly rugulose, shining. Wings slightly fuscous, stigma and nervures dark brown, distance between the first recurrent nervure where it joins the second submarginal cell and the first transverse cubitus, a little shorter than the first abcissa of the radius, the second recurrent nervure received a little before the second transverse cubitus. First abdominal segment smooth and polished at base and apex, punctured across the middle, most of the other segments finely sculptured, punctured and polished.

Black. Clypeus, a triangular supraclypeal mark, a somewhat triangular mark between eyes and clypeus, the longest side of which borders the eye, the upper point extending to the height of the supraclypeal mark, all femora at apex, tibiæ at base entirely, anterior tibiæ in front and all tarsi except apical ones yellow.

Type.—Coll. Acad. Nat. Sci., Phila. Type locality.—Beulah, N. M., August 17, 1901 (H. Skinner). One ♂.

***Panurginus porterse** Ckll.

Beulah. Type locality ♂ ♀.—The ♂ was taken August 25, 1899 (W. P. Cockerell).

***Panurginus cressoniellus** Ckll.

Three ♀, near Beulah, August 23, 1899. One ♂, three ♀ ♀, all by W. Cockerell.

***Perdita zebrata** Cress. *var.*

One ♂. Prof. Cockerell has kindly submitted the following description of this interesting find.

"**Perdita zebrata** Cresson (variety).—♂ Length 4 mm.—Head and thorax dark olive green, sparsely clothed with erect white hairs; thorax, especially mesothorax, shining; front and vertex dull and granular; mandibles sharp and simple, white with black tips, the junction of the black and white suffused with ferruginous; labial palpi with the basal joint black, longer than the other three (which are pallid) united; maxillary palpi six-jointed, basal joint black, the others whitish; face-marks cream color, including clypeus (except the usual black dots), long narrow pointed lateral marks, reaching a short distance above the level of the antennæ, a large quadrate supraclypeal mark, notched above, and large dog-ear marks; antennæ black above, pale yellow beneath, including scape; prothorax entirely margined with very pale yellow; pleura dark; legs pale yellow, all the femora with a large black patch above, and the tibiæ with a large black stripe

behind; wings hyaline, iridescent, nervures and margin of stigma sepia-brown; third discoidal cell indistinct; marginal cell broadly and very slightly obliquely truncate, the substigmatal portion about as long as the post-stigmatal; dorsal surface of abdomen with the first segment entirely black; the second to fourth black with a broad basal yellow stripe, not reaching the lateral margins, and more or less interrupted in the middle; fifth segment yellow with two widely separated subapical black spots; apex yellow; ventral surface yellow, with a triangular black mark on each side of the first segment.

"Beulah, N. M., about 8000 feet, August 5, 1902, one at flowers of *Cicuta*, but doubtless accidental on that plant, as I could not find any more. There was plenty of *Solidago canadensis* close by, but it was only just coming into bloom. The locality is about a quarter of a mile down the canon from the Blake house.

"This insect agrees with *P. zebrata* rather than with *bakeræ*, but there is no *Cleome* within a distance of several miles."—(T. D. A. COCKERELL.)

ANDRENIDÆ.

Andrena beulahensis n. sp. Allied to *salicis* from Pennsylvania. Head broader, front distinctly striate, clypeus convex, apex of pygidial area broad, rounded.

♀ Length 9 mm.—Clypeus impunctate and shining medially, punctured on the sides, most of the punctures strong and separated, process of labrum broadly truncate. Cheeks punctured partly shining. Dorsulum dull uniformly finely roughened, pleura and metathorax much the same, the enclosed space poorly defined, almost bare. Pubescence of thorax, top of head and cheeks dull fulvous, that of the face paler. Wings with a brownish cast, stigma pale brown, nervures dark brown. Second submarginal cell quadrate, the first recurrent nervure received distinctly beyond its middle. Abdomen opaque, finely roughened. The fasciæ not heavy, from ochraceous to whitish. Apex of abdomen with brownish pubescence. Femora and tibiæ with rather pale pubescence, that on the tarsi brownish.

Black. Apical half of mandibles brownish.

Type.—Coll. Acad. Nat. Sciences Phila. Type locality.—Beulah, N. M., August 17, 1901 (H. Skinner).

Andrena apacheorum Ckll.

Var. *a* and *b* (det. Ckll.), at hill above Beulah, August 19, 1899 (W. P. Cockerell). One on flowers of *Jamesia americana*, June 30, 1902 (Viereck).

Andrena platyparia Rob.

July 26, 1899, one ♂ (W. P. Cockerell). One ♂, August 24, (W. Porter).

Andrena truncata n. sp. Superficially like *beulahensis*, from which it differs, by the still broader head, the heavier, parallel, obliquely truncate mandibles, the inner tooth only indicated by a faint dent on the truncation.

♀ Length 10 mm.—Clypeus impressed along anterior margin, shining, with a small central area to each side of which the punctures are well defined and sparse, on the lateral margins, the clypeus is opaque with shallow closer punctures, front finely striate, vertex dull. Entire thorax opaque impunctate, enclosure hardly indicated. Metapleuræ shining. Wings subfuscous, apex faintly clouded, nervures dark brown, stigma slightly paler, the margin concolorous with nervures, first recurrent nervure received by the second submarginal cell just beyond the middle, space between second recurrent nervure and third transverse cubitus on the cubitus, a little shorter than space between first recurrent nervure and second transverse cubitus on the cubitus. Abdomen mostly subopaque, pygidial area narrowly rounded at apex. Pubescence of head whitish of thorax pale ochraceous, of four anterior tibiæ above and all tarsi brown, four anterior tibiæ beneath, the posterior tibiæ entirely, pale brownish, of all femora paler concolorous with fringes of ventral abdominal segments. The hair bands of dorsal segments sparse, whitish on sides, the apex of abdomen brownish, dark.

Black. Tarsi and mandibles somewhat ferruginous.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality.—Beulah, N. M., August 17, 1901 (H. Skinner).

One ♀. Another ♀ 8.5 mm. long (W. P. Cockerell).

Andrena birtwelli Ckll.

One ♀, July 26, on *Heracleum lanatum*, another ♀, July 26 (T. D. A. Cockerell). Hill above Beulah, August 15, 1900 (T. D. A. and W. P. Cockerell). One ♀, June 29, 1902, one ♂, June 27 (T. D. A. Cockerell). These specimens have an ochraceous tint to the pubescence of head and thorax, all other specimens so far seen by me have these parts covered with whitish pubescence. The ♂ now first recorded has the pubescence tinted like the female com mented upon, otherwise it is the same, barring the usual sexual characters; it could not be taken for anything else than the ♂ of *birtwelli*.

Andrena sapellonis Ckll.

Type locality.—Four ♀ ♀, one ♂ at flowers of Salix, two ♀ ♀ at flowers of wild plum, May 20, 1899 (W. Porter). One ♀ on flowers of *Thlaspi fendleri* (T. D. A. and W. P. Cockerell).

Andrena carlini Ckll.

May 30, one ♀ on wild plum (W. P. Cockerell).

Andrena pacta n. sp. Pubescence fulvous, process of labrum truncate, slightly emarginate. No median impunctate line on clypeus. Dorsulum with small punctures. Enclosure of metathorax uniformly, finely roughened. Related to *albovirgata*.

♀ Length 9 mm.—Clypeus shining, deeply and strongly punctured on the disc,

the sides more opaque closely finely punctured, no median impunctate line, process of labrum not so broad, slightly emarginate. Front dull, finely roughened, the cheeks more shining. First joint of flagellum as long as 2 + 3. Pubescence across the face at insertion of antennæ and on mandibles fulvous, that on clypeus and lower parts of cheek paler, tending to whitish. Dorsulum shining, deeply rather sparsely punctured, except on the sides where it is more finely and closely punctured and dull. Pleuræ and metathorax almost uniformly, finely roughened, dull, the enclosure distinguishable chiefly by the absence of pubescence. Dorsum of thorax dark fulvous, heaviest near the margins of the segments. Pubescence on sides of metathorax more ochraceous, below the pubescence of thorax is whitish. Wings slightly yellowish, stigma and nervures largely testaceous, second submarginal cell not regularly quadrate, the first recurrent nervure received beyond the middle. Legs with the pubescence ranging from silvery on the anterior to golden on the posterior pair. Abdomen rather shining, the second, third and fourth segments with a thick fascia of ochraceous pubescence, interrupted on the second, slightly so on the third. Pubescence on apex of abdomen of much the same color as the fasciæ but tinged with brownish.

Black. The mandibles brownish on the apical half. ♂ Length 7.5 mm. Pubescence pale tinted with brown, that on the face darkest, a collection of black hairs on each side of face extending almost to the middle. Clypeus shining, covered with deep, separated punctures. Process of labrum truncate, front very finely roughened. Dorsulum subopaque, indistinctly punctured. Metathorax finely roughened opaque, the enclosure hardly defined. Abdomen subopaque, finely roughened,

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M.

One ♀, one ♂, June 29, 30, 1902 (Viereck).

Trachandrena grandior Ckll.

July 26, one ♀, another ♀ August 18 (T. D. A. and W. P. Cockerell). Two ♀ ♀, June 29, 1902, on flowers of *Ceanothus fendleri* (W. P. Cockerell). One ♀, June 29, 1902, on flowers of *Potentilla* (*pucherimum*?).

•**Andrena segregans** Ckll.

Beulah, type locality, July 26, 1899 (W. P. Cockerell).

•**Andrena americana** D. T.

•**Andrena argemonis** Ckll.

(Oslar) 1902. Beginning of August 1902 (T. D. A. Cockerell).

Andrena atala n. sp. Process of labrum broad, truncate, mandibles broad, slightly indented within the blunt apex. In greater part dull granular.

♀ Length 8 mm.—Process of labrum and clypeus shining, the latter with separated well defined punctures, evenly distributed, no indication of a central

impunctate belt. Front dull, indistinctly granularly striate. Vertex opaque. Third joint of antennæ longer than the fourth and fifth united. Dorsulum sculptured much like the vertex, a shining median line extending back to the middle, a short longitudinal shining line in the middle of each side. Scutellum more shining, longitudinally impressed medially. Metathorax uniformly dull, finely granular. The enclosed space faintly outlined. Wings yellowish, nervures and stigma dark brown, first recurrent nervure received by the second submarginal cell a little beyond the middle. Abdomen shining, finely, indistinctly sculptured. Pygidial area broad. Dorsal segments excepting first, with a sparse interrupted fringe of white hairs Anal fimbria brownish. Head and thorax with fine white hair, except dorsally, frontal foveæ brownish sericeous. Tibiæ and tarsi with brownish hairs.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 18 (W. P. Cockerell).

Two ♀ ♀, comes nearest to *Andrena birtwelli* Ckll.

Andrena delta n. sp. Head and thorax dull granular, mandibles broad, process of labrum indistinct, emarginate.

♀ Length 9 mm.—Front striate shining, clypeus duller, with separated punctures, the punctuation interrupted longitudinally in the middle. Occiput and cheeks finely roughened. The third joint of the antennæ fully as long as the fourth and fifth joints together. Hairs of the head long and white, faintly yellowish around the mouth, the frontal foveæ deep brown, sericeous. Dorsulum dull, sculptured much like vertex, a longitudinal impressed line extending to the middle, a poorly defined short longitudinal shining line in middle of each side. Enclosure of metathorax noticeable by its being slightly depressed, and by the somewhat coarser sculpture of the integument behind it. Hairs of the thorax white, as plentiful as those on head, dorsally almost bare. Wings yellowish, the first recurrent nervure received by the second submarginal cell, one-third its length on the cubitus from the second transverse cubitus. Pubescence of tibiæ and tarsi brownish. Abdomen globose, shining, almost bare, the base of the segments faintly roughened. Anal fimbria brownish.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality. West of Beulah, N. M. One ♀, August 23 (W. P. Cockerell).

Halictus aquilæ Ckll.

One ♀, fourteen ♂ ♂. One ♀ near Beulah (W. P. and T. D. A. Cockerell). One ♀, July 26, head of Dailey Canon, July 26 (T. D. A. Cockerell). Two ♀ ♀, on flowers of *Roripa nasturtium*, June 29, 1902 (Viereck).

Halictus ruidosensis Ckll.

Seven ♀ ♀, three ♂ ♂. Three ♀ ♀, July 28, August 17–25 (T. D. A. and W. P. Cockerell). Three ♀ ♀, July 16, one ♀, July 24, on flowers of *Heracleum lanatum*, one ♀, August 25, 1899 (W. P. Cockerell). One ♀, Dailey Canon, August 10 (T. D. A. and W.

P. Cockerell). June 29, 1902, on flowers of *Ceanothus fendleri* (W. P. Cockerell). *Solidago canadensis* var. August 7 (T. D. A. Cockerell). *Geum trifidum* and *Roripa nasturtium*, June 29, 1902, common (Viereck).

Halictus lerouxii St. Farg.

One ♀, July 16 (T. D. Cockerell).

Halictus similis Sm.

One ♀, Dailey Canon, August 10 (T. D. A. and W. P. Cockerell).

Halictus sisymbrii Ckll.

One ♀, June 30, 1902 (Viereck).

Halictus parallelus Say.

Two ♂♂, June 29, 1902, *Potentilla* (*pulcherimum*)? (Viereck.)

***Halictus bardus** Cress.

May 30, at flowers of Salix. One ♀ (W. P. Cockerell).

***Halictus coriaceus** Sm.

May 30, at flowers of Salix (W. P. Cockerell).

Halictus niger n. sp.—Head minutely roughened dull, dorsulum closely punctured, dull, disk of metathorax quadrate, rugulose. Entirely black.

♀ Length 7.5 mm.—Clypeus convex, shining, with sparse large punctures, face below antennæ sparsely punctured, between the insertion of antennæ is a faint longitudinal raised line, front minutely roughened, dull, closely punctured to the sides, behind ocelli more distinctly roughened, cheeks somewhat shining, sculptured nearly like the front, space between posterior ocelli a litle less than space between them and nearest eye margin, antennæ short, joints of the flagellum subequal, head covered more or less with a brownish pubescence. Dorsulum closely and finely punctured, dull, impressed medially and longitudinally, an indistinct longitudinal line on each side. Pleuræ roughened, somewhat shining. Scutellum partly shining, more sparsely punctured than dorsulum, metathorax truncate, disk quadrate rugulose, posterior face satiny. Dorsulum, scutellum and post-scutellum sparsely pubescent. Wings with the transverse median nervure uniting with the median nervure before the basal nervure, first recurrent nervure joining the cubitus a little before the second transverse cubitus, the second recurrent nervure joining the third cubital cell beyond the middle. Faintly fuscous, stigma pale brown, nervures darker. Legs with golden pubescence especially the tarsi, anterior legs palest. Abdomen shining apparently impunctate, edges of the segments narrowly testaceous, dorsal segments, two, three and four, obscurely hoary, more apparent, but still faint at base, apex of the abdomen with golden pubescence, ventral aspect with pale hair.

♂ Length 6.5 mm.—Flagellum pale brown beneath, clypeus covered with ap-

pressed white hairs, with a yellow mark extending across the anterior margin. Pubescence on cheeks, pleuræ and femora long and fine, whitish. Apex of tibiæ, the tarsi entirely, ochreous to yellow, apical tarsal joint and claws brownish. The sculpture finer, closer more rugulose.

Types.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., (H. Skinner). One ♀, ten ♂ ♂. Appears to be related to *H. nelumbonus* Robt., the ♀ is more slender and especially distinguished by the difference in disc of metathorax. Two ♀ ♀, 6.5 mm. and 7 mm., and one ♂, June 29, 1902, on flowers of *Roripa nasturtium*, June 29, 1902 (Viereck).

COLLETIDÆ.

Colletes simulans Cress.

August 18 (T. D. A. Cockerell). August 18, 1900 (W. P. and T. D. A. Cockerell).. Three ♂ ♂. August 17, 1899 (Martin Cockerell), one ♂.

Colletes skinneri n. sp. Prothoracic spines short, labrum with a pronounced median, longitudinal, elevation,

♀ Length 11.5 mm.—Labrum with smaller, lateral, elevated lines. Clypeus robust, margin entire, slightly incurved. Surface coarsely sculptured with large punctures and longitudinal striæ. Front closely, coarsely punctured. Antennæ with first joint of the flagellum longer than the second. Pubescence on cheeks white, on face grayish white, hairs on occiput with dark tips. Dorsulum coarsely punctured, closely anteriorly, more separated posteriorly, pleuræ also coarsely punctured. Pubescence on the ventral aspect of thorax, concolorous with that on cheeks, pubescence on the dorsulum sparse, partly the color of that on face, partly black. Scutellum coarsely punctured with a fringe of black hairs posteriorly. A fringe from insertion of wings, post-scutellum and sides of metathorax with long pale hairs. Metathorax abruptly truncate the narrow dorsal exposure shining, with large rugæ. Enclosure of posterior face of metathorax infundibuliform, the upper half transversely rugose, with a median longitudinal imperfect line, below smooth and polished, entering an almost smooth area at base of metathorax, sides of metathorax amd space around enclosure coriaceous. Anterior coxæ simple, claws with one prominent tooth, legs with white pubescence, tibiæ and tarsi fringed with pale golden pubescence. Wings hyaline, nervures dark brown, marginal cell appendiculate, second submarginal cell trapezoidal larger than the third, transverse median nervure elbowed outwardly. First recurrent nervure received by the second cubital cell a little before the middle, second recurrent nervure received by the third cubital cell beyond the middle. Abdomen polished, first segment distinctly punctured, with a smooth median longitudinal line, to each side of which the punctures are sparse, becoming closer on the sides, on the succeding segments the punctures become less defined. Fasciæ white, interrupted on first segment, entire on 2, 3 and 4, only a fringe on 5. Pygidium roughened, covered with black appressed pubescence.

Black. Claws, apical tarsal joints and tibial spurs more or less fuscous,

♂ Length 9.5 mm.—Quite similar to the female in appearance, sculpture and wing structure, the central elevation of labrum is not so pronounced. The dorsal hairs paler, the punctuation of abdomenal segments coarser.

Types.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M. One ♀, 1901 (H. Skinner). One ♀ and one ♂, August 18 (T. D. A. Cockerell). The female shows a relation to *C. inæqualis*. Also closely related to *C. kincaidii* Ckll., from which it differs by the smaller size, different sculpture and black hairs of dorsum. The male answers the description of *C. wootoni* Ckll., but differs in the labrum, color of hair on dorsum, sculpture of post-scutellum, and metathorax and size.

Colletes spureus n. sp. Labrum convex shining, space between eye and base of mandible a little less than width of the latter at base, coxæ apparently without spine, prothoracic spines very short, pointed.

♀ Length 8 mm.—Clypeus shining, moderately coarsely punctured almost confluently, sparsely pubescent. The rest of the head more or less punctured, dullish except around ocelli where the surface is shining, face and back to occipital region covered with pale brownish hair, the cheeks with almost white hair. Labrum polished, with a small dent at base medially. Dorsulum with distinct close punctures and a dull surface on anterior half, the posterior half more sparsely punctured, almost impunctate on a median highly polished area. The dorsulum with an abundant brown pubescence which is continued on the scutellum, the metathorax and sides with pale pubescence. Superior disc of metathorax separated from the posterior face by a ridge, the disc divided into narrow shining pits. Funnel shaped enclosure defined, the broad part rugose and much like the sculpture of the sides next the enclosure, the narrow part smooth and shining. Wings brownish, nervures and stigma almost black. Abdomen shining, finely punctured, the segments excepting the apical one, with apical transverse bands of white appressed pubescence.

♂ Length 7 mm.—Facial sculpture almost hidden by a heavy whitish pubescence, clypeus with rather sparse, deep punctures. Surface above antennæ and on occiput closely, indistinctly punctured, dullish. Cheeks more shining indistinctly punctured. Dorsulum with distinct punctures on a shining surface, sparse in the middle, closer near the margins, a fine longitudinal, median, impressed line extending back from the anterior margin. Punctuation of mesopleuræ more moderate than on the dorsum. The pubescence of thorax sparser and darker on dorsum than that of face, on sides and beneath paler. Superior disc of metathorax sharply defined by a transverse ridge, the space between with a series of longitudinal narrow pits, their cavities polished. Posterior face of metathorax with small triangular enclosure, with two short foveæ on its apical middle defining a central elevation. The adjoining surface rather coarsely indistinctly roughened. Wings clear, nervures and stigma very dark brown, first recurrent nervure received by the second submarginal cells distinctly before the middle. Basal segment of abdomen shining, with well separated fine punctures, pilose much like thorax. The remaining segments becoming more and more

closely punctured, bearing dark hairs. All the segments, the apical one excepted with a pure white, narrow band of appressed pubescence on the apical margins.

Black. Apex of mandibles, claws and apical tarsal joint brownish.

Types.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 27, 1901 (H. Skinner). July 28, Dailey Canon, August 10, 3 ♂, 1 ♀ (T. D. A. and W. P. Cockerell. Related to *C. americanus* Cress., which, however, has the distance between eyes and base of mandibles shorter. The sculpture of metathorax coarser, the yellowish pubescence and heavier build. The paratypes have a small round dent at base of labrum. The ♀ is also smaller than *americanus* and conspicuous by the brown pubescence dorsally, not ochraceous as in the species cited. One ♀, June 30, 1902 and one ♂, June 29, 1902, *Roripa nasturtium* (Viereck). One ♂, August 7, 1902, *Solidago canadensis* var. (T. D. A. Cockerell).

Colletes nigrifrons Titus.

One ♀, Crew's Mesa, near Beulah, June 29, 1902 (B. Chapman).

Colletes zonatus n. sp. Labrum convex, polished, with a round dent at base, coxæ apparently without spines, spines of prothorax if present, hidden by pubescence. Distance between eye and base of mandibles about one-half width of the latter at base.

♂ Length 11 mm.—Front and vertex with distinct close punctures, partly dull, partly shining, with a tuft of pale pubescence along the insertion of antennæ, clypeus closely almost confluently punctured on the anterior margin coarsely. Cheeks indistinctly punctured, with fine pubescence, darker than that on front where it is whitish. Dorsulum shining, punctures almost uniformly, closely arranged. Mesopleuræ more finely and closely punctured than the dorsulum. Thorax rather densely clothed especially on the dorsulum, with pale grayish pubescence, faintly tinted with ochraceous. Superior face of metathorax hardly defined, rather shining, but with no distinct longitudinal foveæ. The funnel shaped enclosure dullish, the lateral planes dull, roughened. Wings clear, nervures and stigma dark brown, first recurrent nervure received by the second submarginal cell at about the middle. First two basal segments with fine whitish pubescence finely indistinctly punctured, shining, the following segments similarly sculptured, bearing sparse black hairs. The segments with an apical margin of white appressed pubescence.

Black. Apex of mandibles and apical joints brownish, these same tarsal joints with bright brownish appressed hairs.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., May 30 (W. P. Cockerell). On wild plum. One ♂. Reminds one of the preceding species to which it is nearly related.

Colletes delodontus n sp. Labrum with a round dent at base in the middle with a pair of faint impressions laterally. Space between eyes and base

of mandibles apparently less than half the width of the latter at base. Prothoracic spines rudimentary.

♀ Length 10 mm.—Front with coarse, closely arranged punctures, on vertex they are much finer and sparse. Cheeks indistinctly punctured, shining like rest of the head. Clypeus with coarse, large elongated punctures creating a longitudinal appearance. Dorsulum with deep, large punctures, as closely arranged as possible on the anterior half which is dull. On the posterior half the punctures are scattered on a polished area. Scutellum punctured much like anterior half of dorsulum, sculpture of postscutellum hidden by the pubescence. Mesopleuræ shining, with close deep punctures. Superior disc of metathorax bounded by distinct ridge. The longitudinal divisions defined by strong ridges the spaces longer than wide, polished. The enclosure funnel shape with a broad neck, smooth and shining. The rest of metathorax roughened subopaque. Pubescence of face, cheeks, pleuræ, legs, to the tarsi and basal segment of abdomen pale, grayish. Head and thorax dorsally rather thickly covered with a dull pubescence, tinged with ochreous. Wings clear, nervures dark brown, costal, subcostal and stigma almost black. First recurrent nervure received by the second submarginal cell at the middle. First abdominal with fine well separated punctures on a smooth shining surface, on the second segment the surface is the same as on the preceeding, the punctures closer, the rest of the segments duller, having no distinct punctuation. Apex of abdomen with brownish hairs.

Black. Claws very dark brown.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 25, 1899 (W. P. Cockerell). Paratype.—End of August 1899 (T. D. A. Cockerell), two ♀♀. Two ♀♀, *Roripa nasturtium*, June 29, 1902 (Viereck). These specimens have the pubescence paler, whitish and appressed pubescence at bases of second and third abdominal segments. One is 8 mm. long and has the labrum dull instead of shining.

Colletes paniscus n. sp. Antennæ thickened, the third joint almost twice as broad at apex as at base, longer than the fourth. Labrum convex polished with no impression medially. Sides of posterior face of metathorax finely roughened. In appearance much like *spurcus*.

♂ Length 8 mm.—Anterior margin of clypeus slightly curved in, the surface almost hidden by the long whitish pubescence, punctured rather coarsely, transversely impressed near the apical margin. Space between eye and base of mandibles a little less than the length of the fourth antennal joint. Front and top of head with rather closely arranged small strong punctures. Cheeks roughened. Punctures of dorsulum strong more separated on the disc than near the margins, but not so widely as usual. The surface rather shining. Mesopleuræ shining, the punctures thereon close together, shallow. The superior transverse area of metathorax indistinctly divided, the striæ irregular. Enclosure of posterior face funnel shaped, the neck broad, polished, above the area is closely regulose. Thorax covered with whitish pubescence, the enclosure of metathorax bare, pubescence nowhere thick, almost uniformly distributed. Wings hyaline, somewhat brownish. Stigma and nervures almost black, second submarginal cell almost twice as

long on the cubitus as on the radius, the first recurrent nervure received by the cell distinctly beyond the middle. The legs all covered with a whitish pubescence, that on the inner side of tarsi golden. Abdomen shining with no definite sculpture, the segments covered with a thin whitish pubescence, the fasciæ white, not heavy, that on first interrupted medially.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M. One ♂, June 30, 1902 (Viereck).

Colletes oromontis n. sp. Front of face and sides of thorax with white pubescence, labrum shining with a median tubercle bearing a small dent, about two striæ to each side of the tubercle, sides of posterior face of metathorax minutely roughened. Abdomen smooth. Nearest to *nigrifons*.

♀ Length 8 mm. Clypeus shining closely punctured except on the lateral and apical border where it is more longitudinally striate, apical margin truncate, a slight transverse impression near to the apical margin. Hardly any space between eye and mandible, top of the head and cheeks roughened, somewhat shining. Pubescence of face below insertion of antennæ largely black. First joint of flagellum almost as long as 2 + 3. Greater part of dorsulum shining. The punctures strong, finer and closer near the margins, larger and sparser near the middle. A fine median impressed line extends to the middle. Thorax covered with a pale, grayish pubescence, most abundant dorsally. The superior transverse area of metathorax dull, divided into narrow divisions by longitudinal striæ. Enclosure funnel shaped, the neck narrow shining, above the neck it is less shining, rugose. The enclosure bare. Wings hyaline, slightly darkened, nervures and stigma almost black, second submarginal cell almost half again as long on the cubitus as on the radius, the first recurrent nervure received distinctly before the middle. Anterior legs with a whitish pubescence, on the posterior four the pubescence is blackish, femora excepted. Abdomen shining, first segment polished, almost impunctate, second segment with fine punctures, the other segment indistinctly punctured, covered with black pubescence, the first and second segments with pale pubescence, segments with a white fascia on the apical border, beneath the abdomen has black pubescence.

Type.—Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M. One ♀, June 30, 1902 (Viereck).

Colletes brevispinosus n. sp. Labrum convex, subopaque, with a central and lateral indistinct impressions near the base. Space between eye and base of mandible less than one-half width of latter at that point. Prothoracic spines distinct.

♀ Length 11 mm.—Front with coarse almost confluent punctures, those on occiput much finer and not so closely arranged. Cheeks subopaque, roughened. Clypeus slightly impressed medially, coarsely, confluently punctures, the punctures lengthened longitudinally giving the surface a crude striate appearance. Dorsulum with a faint median impressed line, on the middle of the sides a polished line of about one-third the length of dorsulum. Punctuation on anterior half coarse and close, the surface dull, along the sides the punctures are more separated, the surface shining. From middle of mesothorax back the punctures are very sparse, the surface shining. Pleuræ closely punctured, punctures as coarse as on

dorsulum. Scutellum shining, sparsely punctured along the middle. Superior disc of metathorax defined by a strong ridge, the pits quadrate, shining. Enclosure funnel shaped, the bowl irregularly roughened and produced, the neck perfectly smooth, highly polished. The rest of posterior face somewhat reticulately roughened, subopaque. Wings tinged with brownish, nervures and stigma dark brown almost black. Tegulæ black. Face, cheeks, pleuræ and legs in greater part with pale whitish pubescence. Thorax and head dorsally covered with dark ochreous pubescence mixed with stronger black hairs. First abdominal segment with a tuft of ochreous hairs on the sides and a few delicate whitish hairs on the convexity. The surface polished, punctures small, distinct, closely arranged. Apically the punctuation is finer and closer. Punctuation of second segment uniformly like that of apical margin of the preceding. The rest of the segments indistinctly finely sculptured. Pygidium with appressed dark brown hair. A border of fine white appressed pubescence on suture of first abdominal segment and apical margins of rest of the segments excepting pygidium.

Type, Coll. Acad. Nat. Sciences, Phila. Type, locality, Beulah, N. M. Two ♀ ♀, Aug. 25, 1899 (W. P. Cockerell), paratype end of Aug. 1899 (T. D. A. Cockerell). In sculpture and structure much like preceding species.

***Colletes bigelovise** Ckll. (W. P. Cockerell).

PROSOPIDÆ.

Prosopis antennata Cress.

One ♂. One ♂, June 29, 1902, *Roripa nasturtium* (Viereck).

Prosopis basalis Sm.

One ♂, July 28 (T. D. A. Cockerell). Three ♀ ♀, hill above Beulah, Aug. 19 (W. P. Cockerell), June 29, 1902, *Ceanothus fendleri* (W. P. Cockerell), Aug. 13, 1900 (W. P. and T. D. A. Cockerell).

***Prosopis rudbeckiæ** subsp. **ruidosensis** Ckll.

July 28, Aug. 18 (T. D. A. Cockerell).

***Prosopis trideus** Ckll.

Two ♂ ♂, July 28 (T. D. A. Cockerell).

Prosopis varifrons Cress.

Five ♂ ♂, Beulah and Dailey Canon, Aug. 10 (T. D. A. and W. P. Cockerell). W. of Beulah, Aug. 23 (W. P. Cockerell). End of Aug. (T. D. A. Cockerell). Aug. 17, 1901 (H. Skinner).

Prosopis rugosula Ckll.

One ♂, June 29, 1902, *Roripa nasturtium* (Viereck). The length of this specimen is 5.5 mm., and the markings are lemon color.

Prosopis digitata Ckll.

One ♂, June 29, 1902, *Potentilla* (*pulcherimum*)? (Viereck).

Prosopis nucleolus n. sp. Disc of metathorax rugose, with no large shining pits, abdomen impunctate.

♀ Length 6 mm.—Clypeus, sides of face and supraclypeal area sericeous in certain lights, opaque. The clypeus finely roughened and with sparse indistinct punctures. Sides of the face and supraclypeal area very finely striate. Front dull, finely rugulose except on the extreme sides where it is more shining, sparsely indistinctly punctured. The median line not well marked. The narrow frontal foveæ starting on a line with top of the eye, extend half way down the front, parallel with and close to the eye margin. Occipital region and cheeks dullish, indistinctly punctured. First front of flagellum distinctly longer than the second, a little longer than the third. Dorsulum covered with close shallow punctures, opaque, the median line extending half way back. The lateral lines short and indistinct. Sides of the mesothorax opaque, the shallow punctures more separated than those on dorsulum. Tegulæ with a few punctures on the anterior half. Metathorax with a well defined area, its surface rugose somewhat shining, the lower third opaque, finely roughened like the adjoining areas. Metapleuræ delicately pitted. Wings hyaline with a grayish tinge, second transverse cubitus curved, the second submarginal cell a little longer on the radius than it is broad on the first transverse cubitus. Abdomen shining, apparently impunctate, the first segment polished.

Black. A narrow bow shaped yellow mark on each side of face separated from the clypeus, extending along the eye margin, the lower point almost on a line with the lower margin of the eye, the upper point slightly directed away from the eye margin and on a line with insertion of antennæ. A well marked line on each side of pronotum, greater part of tubercles and basal third of posterior tibiæ yellow, the maculation is of a lemon yellow color.

Type, Coll. Acad. Nat. Sciences Phila. Type locality, Beulah, N. M., May 30, on *Salix* (W. P. Cockerell). In Cockerell's tables, "Entomologist," 1898, this runs to 12 a. sp. from Colorado.

Prosopis senigmus n. sp.—Disc of metathorax rugose, with no large shining pits as in *episcopalis* to which it is related in the face marks, abdomen punctured.

♂ Length 4 mm.—Clypeus dullish and with shallow well separated punctures, the lateral face marks with closely arranged indistinct punctures. The supraclypeal mark with smaller deeper punctures than on the margins of the clypeus. Front almost uniformly closely punctured. Clypeus twice as long as broad at apex. The vertex punctured like the front, the cheeks not so strongly punctured, shining. First joint of flagellum distinctly shorter than the second. The lateral foveæ of front indistinct, close to the eye margin. Mesonotum with closely arranged distinct punctures, those of scutellum larger more separated. Mesopleuræ not so closely punctured as dorsulum. Enclosure of metathorax not so distinct, the adjoining areas rugulose. Metapleuræ shining, indistinctly sculptured. Wings tinged with gray, second transverse cubitus almost straight, the second cubital cell a little shorter on the radius than it is broad on the first transverse cubitus.

Abdomen shining and with small moderately separated punctures, sericeous on the sides and apex.

Black. Supraclypeal mark a little higher than broad at base, the lateral face marks broad bow shaped, contiguous with the lower half of the supraclypeal mark, the side of the clypeus and the eye margin, aside from the slight emargination caused by the insertion of antennæ the upper half is of the same shape as the lower half and of the same length. The clypeus is spotless concolorous with the other face marks, a pale lemon yellow. A line on each side of pronotum, a spot on the tegulæ, and the tubercles are about the same in color as the face marks. Anterior tarsi in front, middle tarsi at base, posterior tarsi on basal third yellow, apical half of tarsi brown, basal half brownish white. Flagellum beneath pale brown above dark brown.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., June 29, 1902 (Viereck).

Prosopis clandestinus n. sp.—First abdominal segment polished, apparently impunctate. "Supraclypeal mark not or hardly longer than broad."

♂ Length 5.5 mm.—Clypeus sericeous, only in certain lights, about one-half again as long as broad, dullish, punctures obscure, sparse. Sides of the face below antennæ very finely striated, and with a few obscure punctures. Front dull, closely punctured, almost rugulose, occipital region and cheeks more shining, the former with separated punctures. Scape curved outwardly, parallel, almost twice as long as broad. First joint of flagellum as long as the second, shorter than the third. Dorsulum closely punctured, dull. Pleuræ and scutellum shining, the punctures thereon separated. Postscutellum opaque, finely rugulose. Enclosure of metathorax uniformly rugose, sides of the metathorax indistinctly sculptured and smooth, opaque. Second submarginal cell a little longer on the cubitus than it is broad on the first transverse cubitus. Second transverse cubitus bent. Thorax covered with a short silvery pubescence. Abdomen shining, first segment highly polished, apparently impunctate, the other segments indistinctly punctured.

Black. Clypeus entirely, lateral face marks and supraclypeal mark a pale orange color. The lateral face marks are contiguous with the clypeus, orbits and half-way upon the supraclypeal mark, slightly notched by the insertion of antennæ, extending a short distance above the insertion of the antennæ as an acute angled mark; supraclypeal mark hardly longer than wide, notched in the middle of the upper border; a short line on each side of pronotum, part of tubercles, anterior tibiæ in front, basal third and apex of middle tibiæ, basal half (almost), and apex of posterior tibiæ and tarsi in greater part; yellow.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., June 29, 1902 (Viereck). Three ♂ ♂.

Prosopis tridentula Ckll.

One ♂, June 29, 1902, *Roripa nasturtium*, 6.5 mm. long, the type 5 mm., it differs in having the wings brownish, hind tibiæ with basal half yellow the rest immaculate, otherwise the specimen agrees very well with the description.

Prosopis citrinifrons Ckll.

One ♂, June 29, 1902 (Viereck), with face marks lemon yellow, in an authentic specimen from Vancouver the markings are a shade darker.

Prosopis wootoni Ckll.

One ♀, Aug. 7, 1902, at flowers *Solidago canadensis*, var. (Ckll.) runs to *wootoni* in the table of females, the wings of this specimen are tinged with brownish.

SPHEGOIDEA.

CRABRONIDÆ.

Xestocrabro sexmaculatus Say.

One ♂ on flowers of *Heracleum lanatum*, July 24 (T. D. A. Cockerell).

Blepharipus ater Fox.

One ♂, 5.5 mm. in length, the smallest specimen on record.

PEMPHREDONIDÆ.

Passalecus mandibularis Cress.

Two ♀♀.

Mimesa alticola n. sp.—Head above and dorsulum sparsely punctured, enclosed space on metathorax large, broad, truncate. Abdomen slender.

♀ Length 7 mm.—Clypeus somewhat produced, slightly emarginate, practically impunctate as is space beneath antennæ, shining, median raised line not extending to middle of space between anterior ocellus and insertion of antennæ, a short lateral raised line extending from each side of base of median line to base of antennæ, the triangular elevation distinct, before the anterior ocellus the sculpture is almost striato-punctate, to the side the punctuation becomes stronger and sparser, especially so in space between ocelli and eye margins, head posteriorly punctured and minutely transversely striate, cheeks obliquely striate, space between posterior ocelli less than that between them and nearest eye margin, space beneath antennæ and clypeus covered with gold tinted, appressed pubescence, though not thickly, the rest of the head with short sparse hairs, antennæ with the first joint of flagellum distinctly longer than the second. Dorsulum sparsely punctured, with a few longitudinal median striæ. Mesopleuræ finely sculptured, with sparse silvery pubescence, scutellum sparsely punctured, enclosed space on metathorax triangular, apex truncated, irregularly radiately ridged, shining, the rest of the metathorax roughly reticulated. Wings brownish, nervures and stigma fuscous, second submarginal cell narrowed at least one-half on the radial nervure, receiving both recurrent nervures, the

first recurrent nervure received one-fourth the length of the second submarginal beyond the first transverse cubitus, the second recurrent nervure received a little more than one-fourth before the second transverse cubitus. Petiole distinctly trisulcate, median sulcus deep, hardly broader at apex than at base, curved, with a few fine hairs, abdomen slender, smooth, polished, minutely pubescent, almost bare, pygidial area not pointed, with a few sparse, ill-formed punctures.

Black. Tegulæ, tarsi and claws more or less fuscous, calcariæ more or less whitish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M.. Aug. 17, 1901 (H. Skinner). Belongs to group *niger*, it is related to *M. cylindricus* Fox. Described from one ♀.

Mimesa basirufus Pack.

One ♀, July 27 (T. D. A. Cockerell). One ♂, Aug. 8, 1900 (T. D. A. and W. P. Cockerell).

Mimesa punctatus Fox.

Psen punctatus Fox, ♀, Trans. Am. Ent. Soc., xxv, 9, 1898.

One ♂ specimen, Aug. 8, 1900 (T. D. A. and W. P. Cockerell). This sex was heretofore unknown. Has the same appearance in general as the female. More slender, head above antennæ with fine brownish hairs, joints two to eight inclusive of flagellum with a weak point beneath, enclosure of metathorax, duller, the striæ stronger. Length 10.5 mm.

BEMBECIDÆ.

Bembex spinolæ Lep.

Two ♀♀.

Bembex rubilipennis Cress.

Two ♂♂.

LARRIDÆ.

Tachysphex dubius Fox.

One ♂.

PHILANTHIDÆ.

Anthophilus albifrons Cress.

Philanthus albifrons Cress., Proc. Ent. Soc. Phila., v, 101, ♂♀.
Philanthus henricus Dunn., Can. Ent. Lond., Ont., xxx, 153, ♀.

One ♂, Aug. 16, 1900 (T. D. A. and W. P. Cockerell). The specimen was at first identified as ♂ of *henricus*, but upon comparison with types of *A. albifrons*, no specific difference could be found.

SPHEGIDÆ.

Ammophila varipes Cress

One ♀, having the apical abdominal segment black instead of red as in the type. The fifth dorsal abdominal segment is distended by a pupa case, presumably that of a species of Stylopidæ.

Ammophila strenua Cress.

One ♀, one ♂. The ♀ is 17 mm. long, length of type 22 mm. The three apical abdominal segments have a dull metallic greenish lustre, in the type the same segments have a deep blue metallic lustre. No other difference was noticed after a careful examination. The male is smaller by about 1 mm., differs only in the sexual characters. First record of the male of this species.

Ammophila extremitata Cress.

One ♂, also the first record of male of this species, head and thorax totally black, without any silvery pubescence, sculpture like that of ♀, second, third, and base of fourth abdominal segments ochreous.

Ammophila vulgaris Cress.

Two ♀, two ♂, one of the males has a black stripe dorsally on the pale segments, the specimen mentioned was collected July 28 (T. D. A. Cockerell).

Psammophila luctuosa Cress.

Ammophila luctuosa Sm., Brit. Mus. Cat. Hym., iv, 224, ♀, 1856.

Two ♀ ♀.

Psammophila cementaria Sm.

Ammophila cementaria Sm., Brit. Mus. Cat. Hym., iv, 223, ♀, 1856.
Ammophila robusta Cress., Proc. Ent. Soc. Phila., iv, 461, ♀, 1865.
Ammophila communis Cress., id., 462, ♂, 1865.

One ♀, three ♂ ♂. The ♀ and ♂, July 29, Aug. 13, respectively (T. D. A. and W. P. Cockerell).

Chalybion cæruleum L.

One ♂.

VESPOIDEA.

CEROPALIDÆ.

Anoplius æthiops Cress.

One ♀.

Anoplius scelestus Cress.

One ♀, one ♂.

Anoplius luctuosus Cress.

One ♀ (H. Skinner). One ♂ on flowers of *Heracleum lanatum*, July 24 (T. D. A. Cockerell).

Anoplius marginatus Say.

Pompilus marginatus Say, Keating's Narrat. Exped., ii, 1824, App., p. 333, n. 2, ♀.

Pompilus (*Miscus*) *petiolatus* Say, Bost. Jour. Nat. Hist., i, p. 3, 1836, p. 305, n. 8, ♀.

Pompilus tenebrosus Cress., Proc. Ent. Soc. Phila., iv, 1865, p. 453, n, 5, ♀.

One ♀, July 27 (T. D. A. Cockerell).

Agenia architectus Say.

One ♀, Aug. 8, 1900 (T. D. A. and W. P. Cockerell).

VESPIDÆ.

* **Vespa maculata** L.

May 30, on wild plum (W. P. Cockerell).

* **Vespa diabolica** Sauss.

One ☿. Hill above Beulah, Aug. 19 (W. P. Cockerell).

* **Vespa diabolica** var. **fernaldi** Lewis.

May 30, on *Ribes* (W. P. Cockerell).

Polybia flavitarsis Sauss.

One ♂. Early part of September (H. Skinner).

EUMENIDÆ.

Symmorphus meridionalis n. sp.—Compared with a topotype of *S. walshianus* Sauss'. ♀, the major differences are parapsidal furrows deeper, first abdominal segment with an indistinct transverse ridge, the space behind transverse ridge with a short raised line at base medially terminating in a groove apically, posterior margins of second, third and fourth abdominal segments roughly punctured.

Clypeus finely punctured, emargination semicircular, eyes almost contiguous with base of mandibles, margin of head continuous and distinct, a short ridge between antennæ extends from superior margin of clypeus up to a level with insertion of antennæ. Front somewhat roughly longitudinally rugose, occiput and cheeks subopaque, sparsely punctured, space between posterior ocelli equal to or a little greater than space between them and nearest eye margin. Prothorax distinctly margined, the corners prominent, the sculpture similar to that

of occipital region, dorsulum opaque, somewhat closely punctured anteriorly, an indistinct longitudinal raised line medially. The pleuræ more shining, covered with silvery hair, apparent in certain lights. Scutellum punctured, with a slight longitudinal median impression. Metathorax subopaque, the pleuræ very finely striate, having a satiny lustre. Wings yellowish subhyaline, the marginal cell brownish fuscous on margins internally, nervures dark brown, stigma paler. Abdomen sericeous, first abdominal segment behind the transverse ridge, closely, roughly punctured, basal three-fourths of second segment shining, with sparse separated punctures, apical segment almost impunctate.

Black. Clypeus and line on scape yellow, line on mandibles, spot between antennæ, spot behind the eyes, spot on each side of prothorax, spot beneath wings, an interrupted band on scutellum, apex of femora, tibiæ entirely, excepting four anterior ones, having a dark line internally, greater part of tarsi, apical margin of first abdominal segment, a broader band at apical margin of second, third and fourth and fifth abdominal segments, sixth segment with two marks; almost concolorous, of a more ochraceous color than the clypeus. Tegulæ brownish testaceous, apical tarsal joints brownish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 8, 1900 (T. D. A. and W. P. Cockerell).

Ancistrocerus albophaleratus Sauss.

Four ♂♂. One ♀. Three males, July 31 and Aug. 18 (T. D. A. Cockerell). One female, Aug. 16 (W. P. Cockerell).

MASARIDÆ.

Masaris marginalis Cress.

One ♀, June 30, 1902 (Viereck).

CHRYSIDIDÆ.

Olochrysis semicuprea n. s.—Head and thorax metallic green, abdomen cupreous.

♂ Length 7 mm.—Clypeus with a black shining margin slightly rounded out disc of the clypeus sparsely distinctly punctured. Face, front, occiput and cheeks with an almost uniform granular sculpture. Space between posterior pair of ocelli a little greater than that between them and anterior ocellus, also distinctly less than space between them and nearest eye margin. First joint of flagellum as long or slightly longer than two following joints united. Length of prothorax distinctly less than the length of the head, slightly impressed in a longitudinal direction medially, the sculpture coarser than that on head, mesothorax with visible parapsidal grooves, extending the whole length of dorsulum, sculpture similar to that of head. Tegulæ closely punctured. Scutellum and metanotum more coarsely pitted than pronotum, the lateral spines of metathorax flattened, blunt. First segment of abdomen granular, with sparse, well defined punctures. Second segment finely granular, with a faint longitudinal elevation. Third abdominal segment more finely granular than the preceding, broad, its apical margin semicircular, sixteen punctures in a furrow close to the margin.

Head and thorax metallic green, somewhat bluish along the sutures, legs mostly black, with metallic green reflections. Flagellum and mandibles black. Abdomen deep cupreous, with purple, greenish and yellowish reflections.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M. One specimen, July 18 (T. D. A. Cockerell). In sculpture and size this comes nearest to *optima* which, however, differs in having the length of pronotum almost equal to the length of the head, and in the uniformly different sculpture.

Tetrachysis cærulans Fabr.

Two ♂ ♂, one July 27 (T. D. A. Cockerell).

Tetrachrysis nortoni Aar.

One ♂, July 24, *Heracleum lanatum* (T. D. A. Cockerell).

TIPHIIDÆ.

Tiphia odontogaster n. sp.—Third, fourth and fifth ventral abdominal segments with a short tooth near the lateral margin.

♂ Length 8 mm.—Clypeus closely punctured, front with shallow punctures almost confluent, a triangular polished space directed down from the anterior ocellus. Punctures behind ocelli, smaller and more imperfect than those on front. Third joint of antennæ distinctly shorter than the fourth, the rest subequal. Prothorax margined. Punctures on pronotum like those of front, but more separated, the posterior margin, smooth, polished. Dorsulum still more sparsely punctured, scutellum with two smooth areas of small size and large punctures. Postscutellum more finely and uniformly punctured. Propleuræ on upper half almost smooth, on lower half from finely to coarsely striate. Mesopleuræ with a strong ridge, behind which the surface is regularly punctured with rather large shallow punctures. Disc of metathorax with a longitudinal enclosure, about one-half again as wide where it joins the postscutellum, which will be called the base, length of the enclosure about twice width at apex. The area strongly defined, a distinct longitudinal raised line extending along its whole length in the middle. The transverse ridge distinct, joining the lateral longitudinal ridges, making a bounded petiolarea, which is roughened, finer and more opaque on the lower half than above. Metapleura with striæ curved forward from the lateral carina to near the middle of the metapleuræ, the surface beyond roughened opaque. Wings clear, nervures very dark brown, stigma black. Basal nervure bent and thickened near the intersection of the cubital nervure. First abdominal segment strongly convex, at base with a node on each side. Polished above, the punctures rather sparse, the punctuation on the sides much closer. Second abdominal segment with well separated punctures, the rest of the segments have the punctuation closer and closer. The entire insect covered more or less with fine silvery pubescence.

Black entirely.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One ♂.

FORMICOIDEA.

MYRMICIDÆ.

Leptothorax canadensis obscurus n. subsp.—Length 2-3 mm. ☿. Clypeus longitudinally impressed medially, the impression rather broad, somewhat smooth and shining, to each side there are longitudinal well-marked striæ. Head longitudinally rugulosely striate, appearing finely dull striate under a low-power lens, hairs very sparse, mandibles striate, five toothed, apical tooth longest. Antennæ eleven jointed, scape and flagellum covered with appressed pubescence. Prothorax reticulately striate, mesothorax rather rugulosely striate closer, metathorax imperfectly reticulate, the teeth of metathorax diverging and extending a little beyond the posterior border of the metathorax, the thorax dorsally bears a few scattered, thickened hairs, sides of the thorax more closely sculptured, the mesonotum has the finest sculpture, that of the metanotum coarsest, this distinction is apparent when viewed by a hand lens. Suture between meso- and metanotum distinct though not deep. Legs very sparsely ciliate, first joint of petiole, as long as high, second joint wider than long, both dull, finely sculptured. Abdomen shining, with sparse short hairs. Head black, thorax and petiole not exactly black brownish black, abdomen black, apex of segments testaceous, Mandibles, antennæ and legs more or less dark ferruginous, part of femora and apical joints of flagellum darker than other parts.

Differs from the European *L. acervorum* by the impressed clypeus, finer sculpture and more distinct thoracic structure. This has not been compared with a specimen of *L. canadensis*, it may be specifically distinct.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Thirteen ☿.

Myrmica rubra var. **schencki** Em.

One ♂, two ♀ ♀, two ☿ ☿. The males and females are almost entirely black, in the workers the head and abdomen are darkest.

DOLICHODERIDÆ.

* **Tapinomo sessile** Say.

(Det. André) (T. D. A. Cockerell).

Liometopum apiculatum Mayr.—♀ Length 14 mm.—Mandibles sparsely punctate, flagellum with one joint longer than the following joint, apical joint excepted. Head and thorax practically impunctate, smooth and shining, sericeous, in addition the head is less and thorax more thickly covered with a yellowish brown erect pubescence. Wings missing. Scale higher than wide, width above one-half width of the scale in the middle, deeply emarginate. Abdomen shining, minutely, closely punctate, sericeous and pubescent, fifth ventral abdominal segment keeled and emarginate.

Black. Mandibles, antennæ, tegulæ, coxæ and tarsi inclining more or less to ferruginous, apical edge of abdomen partly testaceous.

FOMICIDÆ.

Camponotus herculeanus var, **pennsylvanicus** De Geer.

One ♀, twenty ☿.

Lasius niger var. **neoniger** Em.

Eight ♀ ♀, six ☿ ☿. One ♀, July 27 (T. D. A. Cockerell). The females are more robust than those of the eastern forms of *americana* Em., though approximately equal in length (8.5 mm., the wings are more ample, extending beyond apex of abdomen for one-half their length.

Lasius umbratus subumbratus n. subsp.—Length 7.5 mm.—Head and thorax sparsely, petiole and abdomen more thickly covered with erect slender hairs, legs practically nonpilose, pale ferruginous legs, testaceous, mandibles edged internally with black, basal half of wings clouded blackish brown, nervures at base of the wing dark.

Described from one ♀, more nearly related to typical *umbratus* than either of the other known varieties.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Another ♀, July 27 (T. D. A. Cockerell).

Formica rufa var. **obscuriventris** Mayr.

Thirteen workers. The largest specimens measure 7 mm. in length, they have a darker head and thorax than New Jersey specimens, and with the erect hairs shorter and more plentiful on dorsal aspect of thorax and on head above and below. One ♀, July 27 (T. D. A. Cockerell), with wings clouded on basal half by a line on apical half.

Formica rufa var. **integra** Nyl.

Sixteen ☿ ☿, the largest 6 mm. in length, head and thorax, as a rule, somewhat paler than Pennsylvania specimens.

Formica pallida-fulva Latr.

One ☿ agreeing with Emery's interpretation.

Formica fusca subsericea Say.

Eight ☿ ☿.

Formica fusca var. **neoclara** Em.

Eight ☿ ☿.

Formica fusca var. **neogagates** Em.

Two ☿ ☿.

Formica fusca var. **densiventris** n. subsp.—Length 4.5–5 mm.—Underside of head without erect hairs. Head dull, dark fuscous above, paler below, scape same color as cheeks, head and thorax above with sparse few hairs, flagellum darker, especially near apex, thorax dull, dark above like head, along the suture a lateral irregular stripe and metathorax posteriorly paler, coxæ, femora and tibiæ dark like thorax above, anterior tibiæ slightly paler, but faintly shining, apexes, trochanters and tarsi paler, tarsi with sparse hairs, scale not broadened as in *subsericea*, fuscous. Abdomen dull sericeous, dorsal segments with sparse short hairs.

Black. Apical segments pale. Two ☿ ☿.

Type, Coll. Acad. Nat. Sciences, Phila, Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Two ☿ ☿, head of Dailey Canon, June 26 (T. D. A. Cockerell).

The following is submitted by Prof. Cockerell:

List of ants collected at Beulah, Sapello Canon, N. M., May 3, 1902, by T. D. A. and W. P. Cockerell, and determined by Prof. W. M. Wheeler.

1. *Camponotus pennsylvanicus* DeGeer (small var.).
2. *Myrmica rubra* L., sub sp. *scabrinodis* (small dark var.).
3. *Myrmica rubra* L., sub sp. *sulcinodoides* Em. (dark var.).
4. *Formica sanguinea* L., var. *subnuda* Emery, (originally described from British America).
5. *Formica fusca* L., var. *subsericea*.
6. *Formica fusca* L., sub sp. *subpolita* Mayr, var. *neogagates* Em.
7. *Formica rufa* L., var.
8. *Lasius niger* var. *neoniger* Em.
9. *Leptothorax canadensis* Provancher.
10. *Tapinoma sessile* Say. (small var.).

PROCTOTRYPOIDEA.

SCELIONIDÆ.

Scelio ashmeadi n. sp.—Black (legs excepted), wings hyaline, faintly milky.

♂ Length 4 mm.—Head striate anterolaterally, above the middle the head is rugoso-punctate, with sparse appressed pubescence, joints of flagellum dull sculptured. Pronotum, mesonotum and dorsolum rugoso-punctate, pubescent like head, furrows on mesonotum distinct, originating near anterior margin, terminating on posterior margin. Metanotum distinctly angled laterally, impressed medially, posterior half of impression ridged longitudinally, sides of the

metanotum covered with erect, short silvery pubescence. Wings hyaline, appearing milky to the naked eye, stigma directed downward into a short oblique narrow-jointed appendage, stigma not well defined, whitish, radial nervure obsolete. Posterior border of posterior wings ciliate, the cilia longest near base, diminishing in length beyond. First dorsal abdominal segment strongly margined anteriorly, angled antero-laterally, dorsal segments longitudinally striate, space between striæ rugulose, sculpture on first segment strongest, the succeeding ones becoming less so, two apical ones rather rugose, segments four and five somewhat smoothed medially, second segment deeply impressed anteriorly, the third less so.

Black. Femora brown, base of femora, trochanters, tibiæ and tarsi pale brown, claws dark.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One ♂.

CHALCIDOIDEA.

CHALCIDIDÆ.

Chalcis ovata Say.

Three ♀♀. One July 16 (T. D. A. Cockerell).

PERILAMPIDÆ.

Perilampus sp.

One ♂.

PTEROMALIDÆ.

Trigonoderus varipes n. sp.—♀ Length 4 mm.—Face finely reticulated, the areolæ shining, metallic vari-colored, chamelion fashion, the sculpture gives the face a scaly appearance under a low power lens, clypeus longitudinally finely striate, occiput finely transversely striate. Mandibles broad, armed with four teeth on the truncate apex, the three innermost teeth close together, the outermost tooth separated from the others. Flagellum sericeous. Dorsal aspect of the thorax sculptured much like the face, finer laterally than medially, duller and darker. Mesonotal furrows originating antero-laterally curved inward, hardly reaching to the middle of one-half of the dorsulum. Wings hyaline, submarginal nervure with stiff bristles as long as the distance between one and another, stigmal vein clubbed, the knob with a small appendage, the vein itself nearly as long as the prolongation of the marginal vein on the border of the wing beyond the insertion of the stigmal vein. Abdomen acuminate, elongate, smooth and shining above, dark metallic minutely sculptured ventrally, and keeled at base, ventral slit fringed with black hair, the apical segment sparsely ciliate.

Mandibles, scape, trochanters, apex of femora, tibiæ and tarsi, more or less testaceous.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One ♀.

ICHNEUMONOIDEA.

EVANIIDÆ.

Gasteruption incertus Cress.

One ♀.

Pristaulacus occidentalis Cress.

(Det. Bradley) 2 ♂ ♂, June 29, 1902 (Viereck).

ICHNEUMONIDÆ.

Hoplismenus morulus var. **flavitarsis** Cress.

Troqus flavitarsis Cress., Proc. Ent. Soc. Phila., iv, p. 264. ♂ Colorado.

♀ Length 17 mm. Differs from the male by the pale annulus to antennæ, entirely black face and darker wings, in sculpture there is no distinguishable difference.

Beulah, N. M. Aug. 17, 1901 (H. Skinner). One female specimen, it is quite evident that *H. flavitarsis*, is only the western representative of *H. morulus*.

Cratichneumon acerbus Cress.

Beulah, N. M., Aug. 17, 1901 (H. Skinner). Two males.

Cratichneumon pedalis Cress.

(T. D. A. Cockerell). Beulah, N. M. One male, July 26, on flowers of *Heracleum lanatum*. Aug. 17, 1901 (H. Skinner). One female. A typical specimen having the wings fuscous as in the type of the male.

This specimen also has a trace of annulus, which is quite distinct in a Montana specimen in the collection, but liable to be entirely wanting.

Cratichneumon lætus Brullé.

Ichneumon lætus Brullé, Hym., p. 303. ♀.

Ichneumon lætus Cress., Tr. Am. Ent. Soc., i, p. 300.

Beulah, N. M., Aug. 17, 1901 (H. Skinner). One female. In this specimen the antennæ and metathorax are entirely black.

Cratichneumon cockerelli n. sp.—Much like *C. lætus*, prothorax uniformly rugoso-punctate, metathorax black, apical segments of abdomen ferruginous to testaceous in part.

♂ Length 13 mm.—Face deeply and closely punctured, especially medially, cheeks almost confluently. First joint of flagellum distinctly longer than the second, the sutures of flagellum distinct, sides of the prothorax uniformly confluently punctured, almost striate, parapsidal grooves obsolete, dorsulum closely

punctured, opaque anteriorly, mesopleuræ closely punctured, becoming confluent, on the superior and posterior margin finer and almost striate. Scutellum shining, punctures well separated. Areola of metathorax well defind, rugulose, shining, the lateral areas distinct, the areas all rugoso-punctate, post-petiole medially longitudinally striate. Second, third and fourth dorsal abdominal segments closely and finely sculptured, opaque. The apical segments shining.

Black. Face below antennæ, a line upon eye margins, a dot on scape, a dot on posterior angle of prothorax, tegulæ, a dot on pleuræ below tegulæ, scutellum, greater part of four anterior legs, tarsi excepted, basal two-thirds of posterior tibiæ, yellow. Tarsi of anterior legs reddened, tarsi of posterior legs dark. Abdomen dorsally black; greater part of second segment basally, basal half and a border laterally on the third, lateral and apical margins of fourth, fifth, yellow. Base of fourth, all but a large spot on fifth and a small spot on sixth dorsal segments ferruginous.

Related to *C. lætus* Brullé. Type, Coll. Acad. Nat. Sci. Phila. Type locality, Beulah, N. M., Aug. 8, 1900 (T. D. A. and W. P. Cockerell). One male specimen.

Cratichneumon restrictus var. **subrestrictus** n. var.—♂ Length 14 mm. Distinguished from the typical species by the darker wings, the black of abdomen confined to the petiole and the three dorsal apical segments, and the well marked, broad, black, annulus on apex of posterior femora and tibiæ.

Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Two male specimens.

Cratichneumon adonis n. sp.—Enclosures of metathorax not strongly defined. Face, greater part of thorax laterally and ventrally excepting sutures, and metathorax dorsally, yellow. The abdomen excepting apical segments mostly pale.

Length 15 mm.—Face closely punctured, especially medially, more sparsely on sides and on clypeus. First joint of flagellum distinctly longer than the second. Sides of the prothorax deeply concave, with distinct separated punctures, becoming closer on the border, rather striate at base. Dorsulum dull anteriorly where the punctures are very close and smaller, posteriorly the punctures become larger and well separated, the surface shining, origin of parapsidal grooves distinct. Mesopleura well rounded, the anterior ridge rather delicate though distinct. Mesopleuræ with distinct separated punctures above the middle, closer on the borders. Scutellum polished rounded, with separated punctures sparser before than behind. Margins of metathoracic areas not strongly defined, the enclosed spaces rugulose, areola large, roughened, metapleuræ punctured. Enclosed space of petiole not so strongly defined posteriorly, indistinctly sculptured, fainty striate. Dorsal abdominal segments closely, finely punctured, basal segments rather opaque, apical ones shining.

Black. Face, a band bordering the eyes a little more than half way to opex on cheeks, a band along eyes to apex internally, front of the scape, greater part of pro- and mesopleuræ excepting sutures, greater part of coxæ and trochanters, yellow, metanotum darker. Four lines on dorsulum, median ones longest,

laterals short, brownish to ochre yellow. Greater part of four anterior legs and posterior femora and tarsi ochre yellow. Posterior tibiæ yellow, apex brown. Wings subhyaline, nervrues brown, stigma testaceous. First, second and third abdominal segments ochre yellow, a pale brown band at base of third dorsal segment, fourth and fifth dorsal segments dark, with almost black to black base, apical half of sixth dorsal segment dark brown, basal half black, apex of abdomen dark brown.

Related to *C. creperis* Cress. Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One specimen.

Cratichneumon skinneri n. sp.—Dorsulum closely punctured, areola nearly quadrate, the posterior border not distinctly curved. Face, legs and scutellum mostly yellow. Abdomen variegated with black, yellow and ferruginous.

♂ 13 mm.—Face indistinctly rugoso-punctate medially, finely and closely punctured on the borders, clypeus more strongly punctured and sparser. Cheeks deeply confluently punctured, parts of flagellum indistinctly articulated, first joint longer than second, sides of the prothorax closely punctured above the middle, rugose below. Dorsulum closely, almost rugosely punctate, opaque, punctures distinct posteriorly, parapsidal grooves only faintly indicated. Mesopleuræ not strongly margined, anteriorly well developed, closely punctured, somewhat confluently, especially posteriorly. Scutellum closely punctured, punctures separated. Areola truncate anteriorly, the enclosed space shining, sparsely rugose. The other enclosures roughly margined, rugose shining, metapleuræ rugose punctate. Enclosed space of petiole not strongly margined, striate posteriorly. Dorsal segments two, three and four, indistinctly sculptured, rough opaque, the apical segments finely roughened, shining.

Black. Clypeus, face, a line next to margin of eyes internally, to near apex; greater part of four anterior coxæ, trochanters, femora and tibiæ, posterior tibiæ excepting a broad black annulus, a dot on posterior angles of prothorax, tegulæ, a dot below scutellum, basal half of second and third, a narrow border laterally and apically on fourth, fifth and sixth dorsal segments, yellow. Mandibles except base, all tarsi, basal half of posterior femora in part, a band on second and third, greater part of fourth, fifth and sixth dorsal segments basally, more or less ferruginous, apex of abdomen ochreous.

Related to *C. variegatus* Cr. Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Two specimens.

Cratichneumon patroclus n. sp.—Dorsulum finely punctured, areola broad, well defined. Greater part of legs and second and third abdominal segments ferruginous, otherwise mostly black.

♂ Length 8 mm. Clypeus sparsely punctured, punctures on face small, but separated and distinct, quite uniformly arranged, cheeks and occiput rather closely, not so distinctly punctured. First joint of flagellum distinctly longer than the second, the sutures apparent especially near apex. Propleuræ with

separated punctures, punctuation of dorsulum fine and distinct, close yet visibly separated. Anterior margin of mesopleuræ feebly defined, the mesopleuræ punctured closely below the middle, more separately above. Scutellum with fine, well separated punctures. Areola wider than long, anterior margin truncate, surface with a few rugæ, shining, the other enclosures of metathorax well defined, the areas rugose, shining, metapleuræ rugulose. Wings pale, subhyaline, nervures brown, stigma testaceous. Head, thorax and legs more or less sericeous. Area on petiole striate posteriorly. Abdomen dorsally rather opaque, second and third dorsal segments closely and minutely punctured, the other segments indistinctly sculptured, becoming smoother toward the apex.

Black. A spot on each side of clypeus, yellow, four anterior legs except coxæ and trochanters, and posterior tarsi, brownish testaceous, basal joint of posterior femora pale, basal two-thirds of posterior tibiæ ochreous. Apex of petiole, segments two, three and part of fourth ferruginous, edge of fourth segment pale.

Related to *C. cervulus* Prov. Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M. (H. Skinner). One male.

Cratichneumon compar Cress.

John's Canon, above 10,000 ft., June 29 (T. D. A. Cockerell). One ♀.

Cratichneumon pluto n. sp.—Face and dorsulum closely punctured, metathorax distinctly areolated. Almost totally black, scutellum and part of two apical segments white.

♂ Length 9 mm.—Face produced, closely punctured and opaque medially, punctures on sides of face and clypeus more separated, the surface shining, punctures shallow and separated, dorsulum very closely punctured, especially anteriorly, mesopleuræ shining, punctures deep and well separated, areas of metathorax strongly margined, the areola about as broad as long, roughened, shining, the other areas rugoso-punctate, the superior latera area divided transversely by a distinct raised line, metapleuræ coarsely and closely punctured. Wings subfuscous, nervures and stigma dark brown. Medial area of petiole smooth and shining, with three or four punctures. Dorsal abdominal segments very closely, but distinctly punctured.

Black. A small yellow mark bordering apex of eyes. Part of anterior femora and tibiæ yellow to brown. All tarsi more or less deeply brown. Scutellum yellow, a dot on tegulæ, a mark on apex of penultimate dorsal segment and greater part of apical dorsal segment white.

Related to *C. brevicinctor* Say. Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One male.

Cratichneumon gracilicornis n. sp.—Antennæ slender, basal joint of flagellum the longest, more than four times longer than thick. Parapsides only indicated by a depression on anterior margin of dorsulum. Ridges on sides of metathorax not so distinct. Areola about as long as broad, it and the petiolar area distinctly outlined by the raised lines

♀ Length 7 mm. Face, front and occiput finely, closely punctured, partly shining, clypeus polished, sparsely punctured. Dorsulum and mesopleuræ punctured much like face, scutellum polished, apparently impunctate. Metathorax similarly sculptured, abdomen finely punctured, apical segments highly polished. Wings subfuscous, nervures and stigma dark brown, tegulæ almost testaceous. Disco cubital nervure with a short distinct stump of a vein, areolet sessile, rhomboidal.

Ferruginous, some black sutures. Flagellum practically black, with an ochreous annulus just beyond the middle.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Head of Dailey Canon, N. M., June 26 (T. D. A. Cockerell). Might be taken for *C. petulcus* on account of ornamentation.

Barichneumon vescus Prov.

Ichneumon vescus Prov. Nat. Can. ix, 9. ♂.

Ichneumon vescus Cress. Trans. Am. Ent. Soc. vi, 163. ♂.

Beulah, N. M., Aug. 17, 1901 (H. Skinner).

Pseudamblyteles montanus Cress.

One female, having the antennæ entirely black, in a series of specimens the annulus is seen to merge gradually from prominence to obscurity.

Phæogenes beulahensis n. sp.—Greater part of insect black, legs and abdomen varied with dark ferruginous, wings subfuscous.

♂ Length 7 mm.—Clypeus polished very sparsely punctured, face somewhat convex, and closely, finely punctured medially, the punctures larger and more separated laterally. Antennæ about two-thirds as long as the entire insect, first, second and third joints of flagellum about equal in length and about twice as long as thick. Punctures separated around ocelli and on cheeks, the latter shining. Dorsulum finely sculptured anteriorly, opaque, with close, distinct punctures and shining posteriorly, lateral, longitudinal, slightly raised lines on dorsulum, highly polished. Mesopleuræ closely punctured, the impressed line distinct and extending about half-way from the anterior margin of the mesothorax. Scutellum punctured, metathorax distinctly areolated, the areola elongate, pointed above and with a base narrower than its width in the middle. The margins all well defined the areas roughened. Wings striate, though not clearly, dorsal abdominal segments more or less microscopically sculptured, with scattered small punctures, second segment dull, the others becoming more shining, apical one polished.

Black. Greater part of mandibles and base of wings yellow, border of clypeus ochreous. Scape, anterior trochanters in front, greater part of femora, tibiæ and tarsi; base and apex of femora, tibiæ and tarsi of middle legs; joint between trochanters and posterior femora, tibiæ and tarsi (more or less), base and apex of second, third, fourth and fifth abdominal segments more or less, mahogany color.

Hill above Beulah, N. M., Aug. 9 (T. D. A. and W. P. Cockerell), One female.

Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Six specimens, one specimen varies in having greater part of second and fifth, and all of third and fourth abdominal segments ferruginous, two other specimens show a gradation between these extremes.

Spilocryptus exareolatus n. sp.—Face opaque, dorsulum opaque and shining, metathorax indistinctly areolated, head and thorax black, legs and abdomen more or legs ferruginous.

♂ Length 7.5 mm. Clypeus indistinctly sculptured, somewhat shining, face minutely roughened, opaque, head behind ocelli and cheeks finely, indistinctly sculptured, shining. Antennæ as long as from the head to the apex of third abdominal segment, first joint of flagellum distinctly longer than the second, the second longer than the third. Head covered with fine silvery, indistinct hair. Parapsidal grooves distinct disappearing in a rugulose area on the posterior third of dorsulum, the area formed by them opaque, the space to each side indistinctly sculptured, shining. Mesopleuræ roughened, furrow indistinct, crenulate. Scutellum convex, shining. Metathorax rugulose, only the curved transverse ridge behind spiracles distinct, other ridges hardly discernable Dorsulum covered with very short, fine pubescence, that on sternum and metathorax longer. Wings subhyaline, stigma and nervures dark brown, transverse median nervure broken just above the middle, areolet large, first transverse cubitus longer than the second, abdomen finely sculptured, shining, especially near apex, with indistinct very short pubescence.

Black. Four anterior legs excepting coxæ and basal trochanter, more or less testaceous, the posterior femora and apical trochanters darker. Posterior tibiæ brown at apex paler at base. Basal tarsal joint of posterior legs brown, second, third and fourth almost white, the remaining one and claws black or almost. Apex of petiole, second, third and all but apex of fourth abdominal segments, fuscous.

Related to *S. canadensis* Prov. Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner).

Spilocryptus neomexicana n. sp.—Basal joints of flagellum separated by distinct sutures. Parapsidal grooves distinct, transverse raised line on metanotum distinct in middle, faint on the sides. No distinct punctuation on head or thorax. Related to *lophyri* Nort., which differs in the characters cited.

♂ Length 8 mm. Face and thorax dorsally, uniformly finely roughened, opaque. Occipital region, pleuræ and abdominal segments indistinctly, finely sculptured, more shining. Wings subfuscous, nervures dark brown, stigma paler. Areolet pentagonal, space between first and second transverse cubiti on the radial about equal to space between recurrent nervure and second submarginal cell on the cubitus.

Black. An almost continuous ring around eyes; clypeus except apical margin, base of labrum, line on superior lateral margin and inferior lateral margin of prothorax, tegulæ, base of wings, spot below, spot on epimerium, scutellum, spot on postscutellum, posterior face of metathorax, spots on coxæ, trochanters of

four anterior legs, and second, third and fourth joints of tarsi, apical margin of first abdominal; pale yellowish. Annulus of flagellum ochreous, involving about four joints, removed nearly one-third of the length of flagellum from the apex. Rest of flagellum nearly black. Part of coxæ, all of femora, tibiæ and tarsi of four anterior pairs of limbs, nearly testaceous. Part of scape, greater part of posterior limbs, and the abdomen, except black on apical margin of antipenultimate and all of two apical segments of abdomen, ferruginous. Part of trochanters, apex of tibiæ, basal and apical segments of posterior legs more or less deep fuscous to almost black.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 8, 1900 (T. D. A. and W. P. Cockerell).

Plesiognathus fragilis n. sp.—Front polished, dorsulum polished, parapsidal grooves distinct. Mostly black, legs and a mark on abdomen pale.

♂ Length 3 mm. Face below antennæ hairy. Front polished with a faint indication of a median impressed line, the rest of the head apparently impunctate, polished. Cheeks with fine, short pale pubescence. Dorsulum polished, practically impunctate, the grooves strongly impressed, terminating before the posterior margin. Mesopleuræ indistinctly sculptured shining, the pleuræ separated from the sterum by a rugulose impression, narrower and more distinct posteriorly. Scutellum strongly convex. Metathorax areolated, not at all angled, the areas roughened, slightly shining. The areola rather shining, tolerably well defined, the transverse carina separating the metanotum from the posterior face distinct. The thorax almost entirely covered with pubescence much like that on cheeks. Wings hyaline, stigma triangular pale brown, nervures darker. Areolet, pentagonal, recurrent nervure received by the areolet a little beyond the middle, the disco-cubital nervure and transverse medium nervure in posterior wings not broken. Petiole almost as long as posterior femora, about twice as broad at apex as at base, shining, longitudinally sculptured, second segment about twice as broad at apex as at base, and nearly as long as broad at apex, third segment broader than long, nearly quadrate, the exposure of the rest of the segments narrow.

Black. Base of the wings and tegulæ pale brown, the four anterior legs pale almost testaceous, the trochanters and femora behind brown, posterior legs mostly brown, second dorsal segment on posterior half medially, the apical border and the third, the entire length medially rather tawny.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One male specimen.

Phygadenon polita n. sp.—Clypeus with a few punctures, head, dorsulum and abdomen polished, areola and petiolar area confluent.

♂ Length 6 mm. Clypeus and mandibles with a few distinct punctures, face distinctly convex, medially not polished like clypeus, and with separated fine punctures, cheeks polished, sparsely punctured. Scape closely punctured, first joint of flagellum a little longer than the second. Dorsulum polished, sparsely punctured, closest anteriorly, parapsidal grooves starting strong, but short, metapleuræ sculptured much like dorsulum, the groove deep and distinct. Areola and petiolar areas confluent, bounded by a distinct carina, basally shining, apically

finely apparently transversely striate. Wings subhyaline, almost clear, stigma and nervures dark brown, base of the wings yellow. Abdomen polished, petiole about as long as posterior femora with a small oval impression near the apex.

Black. Greater part of mandibles, tegulæ, greater part of trochanters, the femora and tibiæ ferruginous, tarsi dark brown.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner).

Chirotica inermis n. sp.—Head and thorax chiefly microscopically sculptured, pedicel, scape and legs, pale, almost unicolorous, otherwise mostly black. Wings ample, stigma large, triangular.

♂ Length 4.5 mm. Clypeus microscopically sculptured, somewhat shining, anterior part of face much like clypeus, the posterior part more closely sculptured, opaque. Cheeks like clypeus, head around the ocelli and front, opaque. Mandibles short and heavy, bidentate, the teeth short and equal. Sutures of flagellum indistinct. Dorsulum microscopically sculptured, dull, shining, parapsidal grooves not deep nor extending halfway back. Mesopleuræ almost smooth, shining. Metathorax gently convex, indistinctly punctured, rather opaque and with a median impression on the superior face, shining near the base. The spiracles small, round. The metapleuræ separated from the metanotum by a salient rim. Wings subhyaline, the second recurrent nervure almost at right angles with the short vein beyond its juncture with the cubitus, transverse median nervure of anterior wings interstitial with basal nervure; abcissa of disco-cubital nervure curved and about as long as first transverse cubitus. Stigma longer than wide, brown, the corner on the costa and near the basal nervure yellow, from here a hyaline belt extends across the cubito-discoidal cell. The cubito-discoidal nervure between the abcissa and transverse cubitus, the second recurrent nervure in the middle and at apex, with short hyaline breaks, otherwise the nervures are brown, base of the anterior wings yellow. Petiole and second and third abdominal segments minutely sculptured subopaque, the remaining segments shining. Scape, pedicel and tegulæ, testaceous. Mandibles, except basal half and teeth, the legs with the exception of coxæ, more or less ferruginous. Coxæ with an inconspicuous white spot on apex. The second entirely and the third abdominal segment, except apical margin, semi-transparent, with two parallel longitudinal brown lines in the middle and lateral pale brown blotches.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One male specimen.

Lissonota fenella n. sp.—Head and dorsulum finely punctured, subopaque, mesopleuræ anteriorly gently convex, not divided by a longitudinal raised line; transverse carina on metanotum obscurely indicated; raised line separating metanotum from metapleura, distinct, curved, approaching close to the spiracles.

♀ Length 5.5 mm. Clypeus distinctly convex, about one and a half times broader than long, sparsely punctured; face somewhat shining on median elevation, otherwise rather opaque and indistinctly punctured. Front finely indistinctly punctured, cheeks more shining, punctured. Malar space large. Dorsu-

lum very closely, finely punctured. Scutellum convex, a little more distinctly punctured than dorsulum. Meso- and metapleuræ punctured more distinctly than dorsulum. Metanotum opaque, minutely roughened. Wings hyaline; nervures dark brown; stigma much paler, almost transparent; areolet pentagonal; second recurrent nervure received a little beyond the middle. Submedian cell much longer than the median; transverse median nervure in hind wings broken distinctly below the middle. First dorsal segment roughened somewhat like metanotum, the remaining segments less so, the apical ones polished. Ovipositor distinctly shorter than the length of the insect.

Black. Clypeus, mandibles excepting apex, a spot on each side of the head bordering apex of the eye, a line extending from the anterior margin of dorsulum to tegulæ, the tegulæ, base of wings, a spot aside and below, and the coxæ and trochanters of the four anterior legs (more or less); white. All the femora and tibiæ rufous, the tarsi, especially those of posterior legs, brownish.

Type, Coll. Acad. Nat. Sci. Phila. Type locality, Beulah, N.M., Aug. 17, 1901 (H. Skinner). One female specimen.

Lissinota electra n. sp.—Face and dorsulum almost uniformly, rather distinctly punctured. Mesopleuræ anteriorly partially divided by a longitudinal raised line; transverse carina on metanotum distinct, especially medially; raised line separating metanotum from metapleuræ indistinct.

♀ Length 6 mm. Face with close, fine indistinctly separated punctures, opaque as is also the front, cheeks more shining indistinctly sculptured; clypeus not strongly convex, moderately shining, about twice or more than twice as broad as long, with few punctures. Dorsulum sculptured much like face. Propleuræ shining, distinctly punctured. Mesopleura indistinctly shining, in greater part finely and distinctly punctured. Metapleuræ more opaque and not so distinctly punctured. Metanotum opaque, coriaceous, with a median, longitudinal impression extending almost to the transverse carina. Wings hyaline; nervures and stigma a dark brown, the cellular arrangement much like in *fenella*, the first and second transverse cubiti almost joining on the radius. First four dorsal segments opaquely sculptured, almost obscurely punctate, the apical segments shining. Ovipositor almost as long as insect.

Black. Clypeus, mandibles, except apex, spot on malar space, a line from face to, and a spot opposite, lateral ocelli, bordering on the eye, a band on margin of dorsulum, with an internal point. The tegulæ, a spot aside and below, base of anterior wings, coxæ and trochanters of four anterior legs (more or less) and a streak on mesopleuræ posteriorly; white. Otherwise the legs are (with exception of posterior tibiæ and tarsi, which are brown) rufous to ferruginous. Apex of second and third dorsal segments distinctly bordered with a narrow, pale band.

Type, Coll. Acad. Nat. Sci. Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One female specimen, related to the preceding but manifestly distinct.

Meniscus occidentalis n. sp.—Face opaque, closely punctured; dorsulum shining, with separated punctures; mesopleural carina delicate; transverse carina on metathorax prominent; metanotal and metapleural carina distinct.

♀ Length 9.5 mm. Face opaque, indistinctly punctured; malar space large,

more finely sculptured than face; front opaque, more distinctly punctured. Cheek more shining, with fine separated punctures, especially above. Clypeus shining, with a few distinct punctures. Dorsulum closely, distinctly punctured and subopaque anteriorly, posteriorly the punctures are more separated, the surface shining. Punctures on mesopleuræ well separated above, close below. Scutellum distinctly punctured; metapleuræ, finely, closely and uniformly punctured. Metapleuræ with large separated punctures on a shining surface, on each side the margins rugulose, medially rugose. Wings hyaline with a dark cast. Nervures and stigma dark brown. Transverse median and basal nervures interstitial, second recurrent nervure received by the areolet far beyond the middle, areolet almost a right-angled triangle. First dorsal segment somewhat coarsely, longitudinally sculptured, subopaque, the remaining segments subopaque, more moderately sculptured, apical segments almost polished.

Black. Clypeus dirty yellow, a spot on mandibles, a line from face to front bordering the eyes; yellow. Femora, tibiæ, and all dorsal segments except basal part of the first, and a short black lateral line on apical half of one, two and three; ferriginous. The tarsi, especially those on posterior legs, brownish.

Type, Coll. Acad, Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug, 17, 1901 (H. Skinner).

Bathycetes nidia n. sp.—Face and thorax finely punctured, metanotum coriaceous and uniform, ridge separating it from the metapleuræ prominent.

♀ Length 10 mm. Face and clypeus fused, the former convex, medially separated from the clypeus by a kind of excavation; clypeus with a few distinct punctures, the face with very small punctures, larger and wider apart on the borders, but so close on the elevation as to give an opaque appearance; front shining, sparsely punctured. Cheek almost polished, indistinctly punctured. Dorsulum faintly impressed anteriorly, more distinctly raised longitudinally, closely punctured, subopaque. Mesopleuræ with the anterior corner formed by a distinct though slender longitudinal carina, with close small punctures almost uniformly arranged over the whole surface, which is shining. Metanotum opaquely sculptured laterally, obscurely, transversely, striate and shining, medially. The raised line separating the metapleuræ from the metanotum curved, not gently angulate near the spiracles, the metapleuræ sculptured much like the mesopleuræ. Wings hyaline with a brownish cast, nervures chiefly brown, stigma paler. First dorsal segment somewhat shining, microscopically sculptured, more roughened on the sides, spiracles somewhat raised. The rest of the dorsal segments uniformly finely sculptured, the apical ones especially shining. Ovipositor about as long as distance from scutellum to apex of abdomen.

Black. Border on clypeus, madibles except apex, a line on anterior lateral margin of dorsulum, tegulæ, a spot aside and a line below base of the wings, part of four anterior coxæ and trochanters and extreme base of posterior tibiæ; yellow. Anterior pair of legs (excepting apical tarsal joint and claws which are brownish), middle pair of legs (excepting all tarsal joints, which are more or less brown), posterior coxæ and trochanters entirely, and the femora interiorly; more or less rufous. The posterior tibiæ and tarsi are deep brown. The flagellum especially near the apex brownish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah. N. M., Aug. 17, 1901 (H. Skinner). Aug. 8, 1900 (T. D. A. and W. P. Cockerell). Closely related to *Bathycetes scutellaris* Cress. (*Lampronata*) from which it is superficially separated by the comparative, paucity of yellow markings, especially by the abscence of yellow on mesopleuræ, and on the face, also by the darker antennæ and the abscence of scutellar mark, though one of the specimens of this species has the scutellum and base of mesopluræ somewhat dark ferruguous. Structurally this species is different by the curved carina on metathorax, which in *scutellaris* in appreciably angular near the spiracle, and by the more uniform and moderate sculpture of the metanotum, which in *scutellaris* has a medial longitudinal area rather coarsely rugulose.

Harrimaniella ariel n. sp.—Head indistinctly punctured, opaque; dorsulum shining, punctures separated, metathorax regulose, transverse carina strong, median longitudinal carinæ indistinct.

♂ Length 10 mm. Clypeus with a few strong punctures, somewhat shining. Face closely punctured almost shining, front more closely punctured, opaque. Cheeks impunctate on the eye margins, distinctly punctured posteriorly; malar space finely punctured, opaque. Mandibles shining, punctured. Dorsulum shining, distinctly punctured, and closely, on the anterior and posterior margin the punctures are closer and smaller making the surface opaque. Metapleuræ closely and distinctly punctured above, regulose below. Punctures on metapleuræ distinct, somewhat finer and closer than on dorsulum, especially so near the borders. The longitudinal carina on mesopleuræ, strong, terminating abruptly about half way up. Scutellum uniformly punctured. Metanotum rugulose somewhat shining, the median longitudinal carinæ crude and poorly defined. The transverse carina strong, raised line separating metanotum from the pleuræ distinct though slender. Metapleuræ closely punctured, subopaque. Wings hyaline with a dark cast. The basal half of the side of the areolet nearest the apex of the wing, a short distance on the discocubital nervure beyond the middle, and the second recurrent nervure hyaline; nervures dark brown, stigma paler. The costa and other nervures near base of the wing pale to testaceous, the extreme base yellow. First dorsal segment coriaceous, distinctly punctured near apex, laterally. The spiracles not strongly produced the other dorsal segments almost smooth.

Black. Mandibles excepting apex, clypeus, a bifurcate mark on each side of face, a triangular mark on each side of dorsulum anteriorly, greater part of coxæ and trochanters, excepting posterior pair; yellow. Femora, tibiæ and tarsi of four anterior legs; more or less ochraceous. Greater part of posterior femora and and tibiæ ferruginous. Apex of the first, the second, third, fourth entirely and almost all of fifth dorsal segments; brownish red.

Type, Coll. Acad. Nat. Sciences. Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Described from one male. Related to *Harrimaniella varia* (Cress).

Harrimaniella minor n. sp.—Face opaque, finely punctured, dorsulum with poorly defined parapsidal grooves, not extending to the middle, more shining than face and more distinctly punctured, metanotum rugulose, transverse carina distinct, the longitudinal carinæ imperfect.

♂ Length 5 mm. Face indistinctly punctured, cheeks obscurely sculptured, shining, clypeus somewhat shining. Dorsulum punctured, the space between the parapsidal grooves more opaque and closely punctured than the rest of the mesonotum. Mesopleuræ closely and distinctly punctured, especially in the middle, the anterior longitudinal carina poorly defined, almost obsolete. Metanotum with two crude longitudinal carinæ, the space beneath the transverse carinæ somewhat coarsely radiate striate, metapleuræ opaque, finely sculptured, separated from the metanotum by a distinct curved carina which falls a little below the spiracles. Wings hyaline with a dark cast, nervures dark brown, stigma pale brown, areolet petiolate, the second recurrent nervure joining it beyond the middle. First abdominal segment (excepting at apex where it is comparatively smooth), opaque and somewhat longitudinally rugulose, the following segments becoming more finely sculptured and shining, the apical ones being practically impunctate and polished.

Black. Clypeus, mandibles (excepting apex), a triangular spot on face extending upward opposite the middle of the eyes, a somewhat similar mark pointed inwardly on the anterior lateral border of the dorsulum, tegulæ, a spot aside of and below base of wings, a line on inferior margin of propleuræ, coxæ and trochanters of four anterior legs; yellow. Posterior coxæ and part of trochanters black, the legs are otherwise rufous to ferruginous, excepting a black line on posterior femora, and the brown to brown-black color of the tarsi of posterior legs and claws of four anterior ones. Apex of first basal, apex of second and third, and apex of fourth abdominal segments ochreous to ferruginous.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1801 (H. Skinner). One male specimen. This species is related to *Harrimaniella pleuralis*, from which it is distinct, by its smaller size and rugulose metathorax.

Rhyssa skinneri n. sp.—Face rugulose; mesonotum almost uniformly transversely striate, the striæ not appreciably gibbose. Raised line separating metanotum and pleuræ, poorly defined, becoming obsolete below the spiracles

♀ Length 23 mm. Face somewhat elevated medially, the elevation rather longitudinally rugulose, sides and anterior margin of the face polished and moderately sparsely punctured. Clypeus highly polished, distinctly produced into a point medially, and with a row of deep punctures. Cheeks polished, sparsely punctured. Propleuræ polished almost impunctate. Dorsulum transversely striate, the striæ delicate but well defined posteriorly. Carina on anterior half of mesopleuræ becoming indistinct half way up on the pleuræ, strongly striato-punctate before the carina; the inferior half of the pleura rather rugoso-punctate, the superior half, highly polished. Scutellum flattened, transversely striate. Metanotum with a slight median longitudinal impression, delicately transversely sculptured, laterally shining, rugulose; metapleuræ polished, sparsely punctured, rugulose on the superior margin. Wings hyaline with a brown cast, nervures

and stigma dark brown, second recurrent nervure interstitial with the second transverse cubitus. Dorsal abdominal segments finely transversely sculptured, having a satiny lustre. Ovipositor about 29 mm. in length.

Black. A line from malar space to apex of the eye, a band on the superior border of the propleuræ, a spot below on the tubercle, a spot on anterior coxæ, greater part of tegulæ, a large spot beneath, a small spot on mesopleuræ, a spot on medial coxæ, a short line to the side and apex of first, second, third, fourth, fifth and sixth, and a lateral line on seventh dorsal segments; white. Greater part of four anterior legs (excluding coxæ) ochraceous. Apex of first, all of the second trochanters and the femora of posterior pair of legs ferruginous; the tibiæ and tarsi dark brown.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One female specimen, closely related to *R. persuasoria L.*, but distinguished by the difference in sculpture, very distinct in coloration.

Theronia fulvescens var. **mellipennis** n. var.

♀ Length 10 mm. Face shining, finely rugulose medially. Wings strongly yellowish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One ♀.

* **Pimpla atrocoxalis** Cress.

(Det. Ashm.) (T. D. A. Cockerell).

Pimpla neomexicana n. sp.—Clypeus distinctly impressed; parapsidal grooves almost obsolete, metanotum not areolated, truncate behind, the rim not salient. Ovipositor equal to the length of the insect.

♀ Length 8.5 mm. Face convex, with distinct, separated punctures, becoming smaller and obsolete on the margins. Cheeks shining, apparently impunctate. Dorsulum with sparse, minute, indistinct punctures, polished especially near the posterior margin. Parapsidal furrows not strongly defined, more like a narrow longitudinal depression, not extending to the middle of the dorsulum. Mesopleuræ almost impunctate, polished; the anterior longitudinal carina delicate. Scutellum polished. Metanotum polished, sparsely punctured, with a longitudinal median impression, not extending to the transverse carina. Metapleuræ, posterior wings, a transverse line on scutellum, postscutellum and metanotum, like mesopleuræ, separated from metanotum by an imbedded carina. Wings hyaline, with a dark cast; nervures dark brown; stigma paler; areolet sessile; the cubiti almost uniting on the radial nervure. First abdominal segment with a distinct longitudinal carina laterally, extending almost to the apex, polished and sparsely punctate, with rather small punctures. Second dorsal segment impressed, polished and bearing large sparse punctures; the following dorsal segments (the apical ones excepted) all polished, impressed, more finely and closely punctured; the apical segments practically impunctate, shining.

Black. Greater part of mandibles, a narrow interrupted line on inner orbits, the superior margin of pleuræ, tegulæ, a spot beside and beneath, a spot beneath

also the apical border of all but basal and two or three apical dorsal segments (more or less interrupted laterally), white. Part of the two apical segments pale. Dorsulum partly brownish; scutellum, mesopleuræ and ovipositor more ferruginous. Four anterior legs excepting tibiæ and tarsi testaceous, marked with white; the tibiæ whitish with a brown stripe; tarsi whitish, more or less marked with brownish. Posterior legs darker testaceous, excepting tibiæ, which are almost wholly brown, with a white stripe; tarsi brown.

Type, Coll. Acad. Nat. Sciences. Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One specimen, related to *Pimpla notanda* and *petulca*.

Pimpla pterelas (Say ?) Walsh.

Pimpla [*pterelas*] Walsh, Tr. St. Louis Ac., iii, 133, ♀.

Pimpla pterelas Say (*Ichneumon*) Cress., Syn. Hym., p. 217.

There are specimens of both sexes in the Coll. Am. Ent. Society from Pennsylvania, New Jersey, Illinois, Massachusetts. Two specimens from Pennsylvania vary in maculation of posterior legs, the tibiæ and tarsi in one specimen being almost unicolorous, rufous, in the other annulate with dark brown and white, in this respect the Beulah ♀ specimen agrees with the latter, though the antennæ are entirely black, however in the male specimen from Beulah the antennæ are inclined to brownish. The male of this species is readily assigned, having practically the same scheme of sculpture and coloration as the ♀. One ♀ and one ♂.

Glypta areolata n. sp.—Face shining; parapsidal grooves distinct anteriorly, disappearing among punctures near the middle of the dorsulum; metathorax with the areola and petiolar area united, somewhat diamond shaped.

♀ Length 6.5 mm. Face sparsely punctured, longitudinally elevated in the middle, a short carina extending down from the antennal socket, cheeks shining, indistinctly sculptured, clypeus subopaque. Dorsulum closely and distinctly punctured, opaque medially in the posterior half of the mesonotum, otherwise the surface is sparsely to finely punctured and shining, pro- and mesopleuræ polished, the latter sparsely punctured, the longitudinal carina of mesopleura distinct, the space in front excavated. Metanotum shining and covered with fine sparse punctures, the carinæ well formed, a transverse lateral carina extending from middle corner of the diamond to a poorly-defined carina on the side of the metathorax, above the spiracles the metapleuræ are more closely punctured, the separating carina curved and distinct. Wings hyaline, with a dark cast, nervures dark brown, stigma very pale brown. First dorsal segment with two longitudinal carinæ, extending a little beyond the middle, sides strongly punctured, confluently on posterior half, polished at or near the middle, with a transverse punctured impression before the apex, the second, third and fourth dorsal segments similarly sculptured, and with diagonal impressions,

forming a triangular space, the greater part of which is polished, otherwise closely punctured, subopaque, the apical segments almost impunctate, polished; ovipositor somewhat longer than abdomen.

Black. Clypeus, mandibles excepting apex and apical margin of third dorsal segment, cream color. Margin of propleuræ, tegulæ, base of wings, a spot on scutellum behind, a spot on postscutellum, edge of apical dorsal segments and apex of hypopygium, white. Dorsulum, greater part of mesopleuræ, scutellum, metapleuræ and metanotum, more or less ferruginous; anterior coxæ whitish, middle coxæ pale testaceous, posterior coxæ darker testaceous. Legs beneath whitish, above and tarsi entirely brownish.

Type, Coll. Acad. Nat. Sci., Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Described from one female specimen.

Ophion bilunatus Say.

John's Canon above 10,000 feet. June 29 (T. D. A. Cockerell).

Nototrachys reticulatus Cress.

One ♂.

Exochilum varicolor n. sp.—Parapsidal grooves only indicated by a slight depression, thickly punctured; the longitudinal carina on the anterior part of mesopleura short, somewhat distant from the pro-mesopleural suture; metathorax distinctly excavated between the neck and insertion of coxæ.

♂ Length 15 mm. Face with coarse, close and confluent punctures, shining; clypeus shining, with a few large deep punctures, anterior margin with a row of fine separated punctures. Cheeks finely, closely punctured. Dorsulum anteriorly and posteriorly medially more or less closely, coarsely punctured, the sides polished, with smaller, regular, well-separated punctures, mesopleuræ almost uniformly, closely, coarsely punctured. Metathorax dorsally distinctly reticulate, somewhat concave, with curved, poorly-defined transverse carinæ near the neck, the raised sides with irregular, crude, longitudinal carinæ, the sides of the mesonotum not so distinctly reticulate, the mesopleuræ opaque, rugulose, the suture hidden. Wing transparent, faintly yellowish fuscous. Stigma and costa yellowish, nervures brown. Head and thorax covered with fine greyish pile, sparsest and longer on metathorax and on pleuræ. First two segments of abdomen polished, the remaining segments dullish sericeous.

Black. Antennæ somewhat ferruginous. Face, clypeus, labrum, part of scape, scutellum, and four anterior legs, excepting coxæ above, almost entirely yellow. Trochanters, base of femora, about two-thirds of tibiæ basally and tarsi; yellow, ochreous, rufous and ferruginous. First, second, third, fourth and part of fifth abdominal segments ferruginous, the second with a black line dorsally; the meso- and metapleuræ are liable to have ferruginous spots.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M, Aug. 17, 1901 (H. Skinner). Evidently related to *E. occidentale* Cress., from which it differs in size, structure and coloration. Two male specimens.

Limnerium obscuripes n. sp.—Face and dorsulum opaque; longitudinal ridge on mesopleuræ distinct; parapsidal furrows absent; metathorax imperfectly areolated. Areola and petiolar area not separated by a carina.

♀ Length 7 mm. Face finely indistinctly sculptured, the tegument mostly obscured by silver pubescence, cheeks more shining. Dorsulum medially anteriorly, finely, obscurely sculptured, posteriorly rugoso-punctate sides, somewhat shining, finely, closely punctured. Mesopleura more or less shining, more closely punctured below than above the middle. Metathorax with the basal area narrow, much longer than wide, the areola longer than wide, the petiolar area widening promptly. Lateral area not divided, separated from the pleural area by a distinct carina, mesonotal mesopleural carina distinct, areas all opaque, minutely granular. Wings transparent, with a dark cast, nervures dark brown, stigma paler, cubiti uniting on the radial nervure, second recurrent nervure received beyond the middle of the areolet. Abdomen opaque to subopaque, apical segments considerably inflated; ovipositor exerted, hardly one mm. in length.

Black. Mandibles a dirty yellow, trochanters of four anterior legs much the same color; anterior femora, tibiæ and tarsi, median and posterior tibiæ and tarsi obscurely colored, from dark ferruginous to brown. Greater part of the third segment ferruginous; part of the fourth segment ferruginous to testaceous.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). Two female specimens.

Limnerium australis n. sp.—Face and dorsulum opaque, the latter with a median longitudinal impressed line, the longitudinal carina on mesopleura prominent. Metathorax almost without raised lines

♀ Length 5 mm. Face indistinctly punctured, clypeus more shining, cheeks dull shining. Dorsulum finely obscurely sculptured, parapsidal grooves absent. Mesopleuræ shining on the upper half, obscurely sculptured and opaque on the lower half, a short impressed line extending backwards from the longitudinal carina. Metathorax with a broad basal area, an oblique line directed from each posterior corner, an indistinct line running from the end of this line to the imperfect lateral longitudinal line, the apex of the metanotum with a lateral short line, mesopleura separated from the mesonotum by a moderate raised line. Metathorax opaque, indistinctly and finely sculptured. Wings transparent, with a dark cast, nervures dark brown, stigma pale brown, areolet distinctly petiolate, the petiole shorter than either cubitus, recurrent nervure received by the areolet before the middle. Petiole of abdomen narrow and smooth, suddenly dilated beyond the middle. Ovipositor about one-third the length of the abdomen.

Black. Mandibles (excepting apex, which is brownish), second trochanter of anterior and middle legs, base of wings and part of tegulæ, greater part of abdomen ventrally, yellow. Anterior femora except base, tibiæ, tarsi, middle femora except base, more or less dark ferruginous; middle and posterior tibiæ dirty whitish above, excepting at base and apex.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One female.

Limnerium tæniolata n. sp.—Head and dorsulum opaque; parapsidal furrows well impressed; areola almost quadrate, a little wider than long; areolet petiolate.

♂ Length 5 mm. Face indistinctly, finely sculptured, the silvery pubescence not heavy, sculpture of front coarser, cheeks more shining. Parapsidal grooves not clearly marked, more like a roughened impressed line, disappearing near the middle of the dorsulum among the coarsest sculpture thereof, the sculpture of the sides similar to that of the anterior one-third of the dorsulum, fine, indistinct. Mesopleuræ finely closely roughened, opaque on the lower half, less closely sculptured and more shining above. Areola well defined, comparatively small; the lateral area divided by a distinct transverse carina extending across from below the middle of the areola. The petiolar area extending from side to side at the base. The surface of the metathorax rugulose. Wings transparent, with a dark cast, nervures darker than the stigma, which is pale brown, second recurrent nervure received by the areolet at about the middle. The posterior half of the petiole about twice as wide as the anterior half.

Black. Trochanters of four anterior legs, part of anterior coxæ and mandibles, yellow, otherwise the four anterior legs are rufous; second trochanter of posterior legs yellow, the femora ferruginous, apex of the second, a wide band on apex of third, a wider band extending along the lateral margin of the third dorsal segment somewhat orange-rufous; the fifth dorsal segment at apex, and especially to the sides, brownish. The venter yellowish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One male. This might be taken to be identical with the description of *L. flavicincta* Ashm. as far as it goes, it does not mention the sculpture of metathorax which furnishes important and reliable characters. However, it does differ in size and some slight color marking, and I believe it to be distinct.

Cidaphurus spinosus Cress.

One male.

Cidaphurus borealis Cress.

One male, July 27 (Ckll.).

Mesochorus agilis Cress.

One female.

Mesochorus areolatus n. sp.—Face longitudinally raised medially; mesonotum with deep parapsidal furrows. Metathorax with the areola and basal area united, almost quadrate, large Petiolar area large, almost as broad as long.

♀ Length 3.5 mm. Head, dorsulum and mesopleuræ polished. Metathorax uneven, but shining, the carinæ forming the lateral and posterior boundaries of

the areola and those defining petiolar area strong. Wings transparent, with a dark cast, nervures dark brown, stigma large, pale brown, areolet sessile, narrow, almost a perfect oblong. Petiole sculptured, subopaqe, the spiracular region distended, at apex not twice width of base, the rest of the segments becoming impunctate and polished. Ovipositor almost half the length of the abdomen. The entire insect is covered more or less with sparse white hairs.

Black. Tegulæ and four anterior legs testaceous, posterior legs darker than the anterior ones, coxæ and femora partly, tarsi entirely, brownish. Second and third segments somewhat brownish, apex of second segment testaceous, venter mostly testaceous.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner).

Porizon canaliculatus n. sp.—Parapsidal furrows indicated by moderate opaque depressions; mesopleuræ with a curved impressed line; metathorax with a channel (in place of basal and superior areas), which is connected with the petiolar area.

♂ Length 5 mm. Clypeus shining, with separated punctures, face more opaque, very finely, closely punctured, space between lateral ocelli and eyes and cheeks polished, punctured. Dorsulum opaque, finely sculptured, a space in the middle of posterior half, more coarsely sculptured, on the lateral border of posterior half shining and distinctly punctured. Scutellum with lateral margins Mesopleuræ with a curved impressed line extending from near insertion of median coxæ to the middle of the anterior margin, mostly shining, somewhat indistinctly punctured. Wings transparent, faintly infuscated, stigma dark brown, nervures paler, areolet open, pentagonal. Metathorax with a narrow channel, defined by two parallel coarse ridges extending halfway down, where it unites with the petiolar area, which broadens out to the width of the metathorax at base, the channel with a few transverse rugæ, metanotum rugose, shining. Mesopleuræ separated from metanotum by a raised opaque line, the sculpture finely rugulose, opaque, abdomen polished. Petiole slender, not much broader at apex than at base, abdomen about twice as long as petiole.

Black. Posterior tibiæ, second trochanter and part of second and third abdominal segments more or less ferruginous, anterior legs excepting coxæ and trochanters, femora and tibiæ of median legs paler, median and posterior tarsi brownish.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). The paratype has the face more shining and the metathorax more coarsely rugose, the ridges less perfect.

BRACONIDÆ.

Anarcha micans n. sp.—Face below insertion of antennæ raised longitudinally into a rounded carina. Mesothorax not sculptured, with a longitudinal median sulcus posteriorly.

♀ Length 3.5 mm. Most of the head highly polished, face shining, obscurely

sculptured. Dorsulum polished, parapsidal furrows deep, terminating a little before the middle, the longitudial sulcus which originates near the centre of the dorsulum extends backwards, becoming narrower and entering a transverse excavation on the posterior border of the mesonotum, this excavation has a longitudinal raised line medially. A few small punctures are scattered around the border of the sulcus. Mesopleuræ shining, with a wide transversely wrinkled channel which terminates as a line near the posterior border of the mesopleuræ; metathorax shining, coarsely rugose, with a longitudinal, median, opaque, poorly-defined, fingerlike impression on the basal half. Wings transparent, infuscated, stigma and nervures unicolorous, dark brown, second submarginal cell on the cubitus longer than the first, on the radius shorter than the first cubitus, but longer than the second. First joint of abdomen dorsally, longitudinally striate, satiny, the rest of the segments polished.

Black. Femora ferruginous, more or less brown at apex, the tibiæ brownish-ferruginous, tarsi brown.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One specimen. This coincides with *Alysia fossulata* Prov. in regard to the remarkable impression on mesonotum.

Meteorus agilis n. sp.—Parapsidal grooves deep, converging, disappearing in a rugulose area a little behind the middle of dorsulum. Metathorax rugose.

♀ Length 4 mm. Ovipositor 2.5 mm. Clypeus convex, impressed within, anterior margin shining, face somewhat shining, indistinctly punctured, front and cheeks apparently impunctate, polished. Dorsulum apparently finely punctured, shining. Mesopleuræ somewhat rugulose above and below the middle, where they are polished, a finely rugulose track extending from a little below the anterior middle to the posterior border near medial coxæ, this is not clearly defined. Metathorax rugulose, though not coarsely, with a faintly defined line on the superior half, medially. The metapleuræ not separated from the metanotum. Wings hyaline, stigma dark brown, with one corner pale, the nervures about the same color as stigma. Submedian cell longer than median, but not as much as the length of the transverse median nervure. Second abcissa of radius a little longer than twice the length of the first abcissa, the first transverse cubitus about as long as the first and second abcissaa of radius united, the second cubital cell on the cubital nervure as long as first transverse cubitus, the second transverse cubitus as long as the second abcissa of radius. Petiole finely rugulose, the rest of the segments polished.

Black. Scape, clypeus, base of propleuræ, tegulæ and base of wings somewhat ochraceous-rufous, mandibles, excepting apex, four anterior legs, and all all the coxæ brownish testaceous, the posterior femora and tibiæ darker, at apex brown, tarsi dark brown. Second abdominal segment somewhat brownish.

♂ A little smaller than the female, almost identical in structure and coloration, differing chiefly in the less close sculpture of metathorax and in the more plainly defined longitudinal raised line.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah,

N. M., August 17, 1901 (H. Skinner), Three females, one male. The metathorax is subject to slight structural variation, in the paratypes the sculpture is somewhat coarser and the raised line absent.

Meteorus mellinervus n. sp.—Face subopaque; parapsidal grooves almost obsolete; metathorax with a delicate median raised line. First abdominal segment polished.

♀ Length 3 mm. Ovipositor somewhat shorter than the abdomen. Face and clypeus indistinctly sculptured. Cheeks polished. Dorsulum shining on the borders, a quadrate space in the centre rugulose-opaque. Mesopleuræ mostly polished, almost impunctate, with an oblique, delicately defined, rugulose impressed track. Metathorax moderately rugulose, the raised line extending from apex to base. Mesopleura visibly separated from metanotum, less coarsely sculptured. Wings hyaline, faintly yellowish, stigma pale testaceous, nervures darker, transverse median nervure received a little beyond the basal nervure, almost interstitial. Second abcissa of radius hardly twice the length of the first abcissa, the first cubital nervure about as long as the first and second abcissa united, the second cubitus a little longer than the second abcissa of radius, the second abcissa of cubitus a little shorter than the first cubital nervure. First abdominal segment obscurely, finely, longitudinally striate, all the segments polished.

Head more or less dark ochraceous-rufous, apex of mandibles, spot between ocelli, dark brown. Mesonotum colored almost like head, except laterally, where it is almost black, pleuræ various shades of brown, metapleuræ partly dark brown, metanotum entirely, almost black. Segments two and three more or less dark testaceous to brownish. Apex of abdomen pale, before the apex brown. Coxæ, trochanters, femora and tibiæ pale, somewhat testaceous, tarsi darker.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). One specimen.

Chelonus sericeus Say, ♀.

Nine specimens, one July 27 (T. D. A. Cockerell).

Chelonus filicornis Cam.

One ♀.

Chelonus australis n. sp.—Clypeus and scutellum shining, otherwise opaque. Spines of metathorax short, blunt.

♂ Length 4 mm. Clypeus closely punctured, slightly impressed medially. Face transversely rugose. Cheeks indistinctly sculptured. Head transverse. Dorsulum rugoso-punctate, somewhat smooth on the sides posteriorly. Mesopleura more finely sculptured. Mesothorax rugose, with two widely separated, crude, longitudinal carinæ. Metapleuræ more distinctly punctate than mesopleuræ. Wings subhyaline, stigma almost black, basal nervures pale, otherwise the nervure are light brown. Space between the basal and transverse median nervures on the medial nervure greater than the length of the first abcissa of

the radius. Abdomen about twice as long as broad across the middle, rugulose from striate on basal half to finely rugulose on apical half.

Black. Anterior femora, excepting base, apex of median femora, the four anterior tibiæ entirely, and posterior tibiæ with a broad annulus rufous to ferruginous. Tarsi dark brown to black. Abdomen with a yellowish spot bordering on the lateral edge not far from the base.

Related to *iridescens*. One specimen. Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner).

Cremnops hæmatoides Brullé.

Two ♀ ♀. One July 29 (T. D. A. Cockerell).

Agathis parvus n. sp.—Metathorax with two longitudinal carinæ, the space between narrow and rugulose. Second abdominal segment with a semicircular disk at base, defined by impressions.

♀ Length 3.5 mm. Head entirely polished, apparently impunctate, length of clypeus less than length of malar space. Antennæ covered with a very short pubescence, the joints not easily distinguished. Dorsulum polished. Mesopleuræ polished, with a deep oblique fovea. Metathorax on disc laterally with a polished space, otherwise rugulose. Areolet poorly triangular, the cubiti not exactly contiguous on the radius. Space between basal and transverse medial nervure on the medial nervure a little greater than the length of first abcissa of radius. Wings subhyaline, stigma and costal nervure almost black, nervures pale brown, those on basal half of wing testaceous. Abdomen polished, basal segment indistinctly sculptured, ovipositor one-half again as long as abdomen.

Black. Apical half of anterior femora, apex of median femora and the four anterior tibiæ entirely, varied from brownish-rufous to brown, posterior femora partly dark brown, the tibiæ with a brownish annulus medially.

♂ Length 3.5 mm. Differs only in the less defined longitudinal area of metathorax, the more truly triangular areolet and lighter markings of legs.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). Six specimens, two ♀ ♀, four ♂ ♂. From the series at hand this appears to be a constant species in structure and coloration.

Microdus meridionalis n. sp.—Metathorax with all ill-defined longitudinal, narrow area; second and third abdominal segments with impressed lines.

♂ Length 3.5 mm. Head polished, face indistinctly sculptured. Parapsidal groove only defined anteriorly for a short distance, a short longitudinal impression extending back from the centre forming a deep dent. Metathorax with two poorly-defined longitudinal lines, space between above the middle very narrow, below diverging until twice broader at base than at apex. The space between the carinæ rugulose, a small smooth area to each side, otherwise rugulose. Wings hyaline, with a dark cast, areolet triangular, space between basal and trans-

verse medial nervure on the median nervure less than the first abcissa of radius. First abdominal segment almost longitudinally rugulose. The second segment with oblique impression, making an almost triangular enclosed space on base of the segment. Third segment with a curved impressed line, making a crescent shaped enclosed space at base of the segment, beyond the last-mentioned segment the abdomen is polished.

Black. All femora excepting at base, brownish-rufous, the four anterior tibiæ in greater part of a similar color, the tarsi all darker, the posterior ones brown, posterior tibiæ brown at base and apex, yellowish between.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., August 17, 1901 (H. Skinner). Described from one male specimen.

Microplitis sp.

Urogaster sp.

* **Melanobracon apicus** Cress.

(Det. Ashm.) (D. T. A. Cockerell).

Rhogas nigricoxis n. s.—Dorsulum with slightly impressed parapsidal grooves; metathorax with a delicate longitudinal carina. First and second abdominal segments with a median longitudinal carina.

♂ Length 6.5 mm. Head almost entirely rugulose-opaque, cheeks shining, indistinctly punctured. Antennæ fifty-two jointed. Dorsulum shining, indistinctly closely punctured, the parapsidal grooves terminating in a rugulose-opaque area on posterior half of mesonotum medially. Prothorax rugulose, mesopleura more finely rugulose above and below, shining along the middle. Metathorax opaque, rather finely rugulose the longitudinal carina not strong, opaque. First abdominal segment indistinctly, longitudinally sculptured, the carina distinct, the shining dent at extreme base of the segment almost quadrate, second segment more finely sculptured, the carina almost disappearing, third segment very finely striate anteriorly, polished posteriorly like the rest of the apical segments. Wings subhyaline, with a dark cast. Stigma very dark brown, nervures paler, space between the transverse median nervure and the basal nervure on the median nervure about equal to the length of the second cubital nervure, the transverse median nervure not joining near the middle of the first discoidal cell.

Black. Anterior femora and tibiæ, median and posterior femora and tibiæ, except dark apices and darkened apical half of posterior tibiæ, first, second and base of third abdominal segments, ferruginous; the abdominal segments darkest.

Type, Coll. Acad. Nat. Sciences, Phila. Type locality, Beulah, N. M., Aug. 17, 1901 (H. Skinner). One male, related to *R. terminalis*, from which it is distinguished by the shining dorsulum, uniformly different sculpture and color.

SIRICOIDEA.

SIRICIDÆ.

Sirex flavicornis Fabr.

One ♀, Aug. (T. D. A. Cockerell).

Paururus cyaneus Fabr.

One ♀, July 31 (T. D. A. Cockerell).

CEPHIDÆ.

Cephus cinctus Nort.

Cephus occidentalis Ril. Marl. Ins. Life, iv, 1891, p. 177. ♀ ♂.

One ♀, July 16 (T. D. A. Cockerell). From the description there can be no question as to the identity of the *occidentalis* and *cinctus*. The type is one male specimen in Coll. Am. Ent. Society, Colorado, and a series of both sexes from Salt Lake City, Utah, June, 13, 1891 (Browning), Nevada, California and Montana.

HYLOTOMIDÆ.

Hylotoma macleayi Leach.

One ♀, July 15 (T. D. A. Cockerell), the specimen has the antennæ and femora entirely black, the anterior and median knees, the anterior tibiæ and tarsi in front brownish, whitish, posterior tibiæ with a white streak behind. The wings practically hyaline, fuscous on each side of abcissa of radius, and on about one half of second submarginal cell which has an almost black dot in the middle.

Hylotoma clavicornis Fabr.

One ♀, July 24 (T. D. A. Cockerell). Antennæ, femora and wing colored like the preceding, anterior and median knees brownish white, posterior tibiæ paler, whitish except the brown apex. Otherwise the tibiæ and tarsi are almost entirely dark brown.

TENTHREDINIDÆ.

Tenthredo flavomarginis Nort.

Two ♀ ♀, having the cheeks immaculate, one specimen July 24, on flowers of *Heracleum lanatum* (T. D. A. Cockerell).

Tenthredo nupera Cress.

Two ♂ ♂, one July 24, on flowers of *Heracleum lanatum* (T. D.

A. Cockerell). Both specimens have the black stripe above on femora very prominent. This species is probably identical with *T. signata* Nort. of the eastern States.

Tenthredo luteipes Cress.

One ♀, Aug. 8 (T. D. A. and W. P. Cockerell). Differs from the type specimens (Nevada), in having a supraclypeal yellow dot, a brownish area at base of cheeks, the anterior and median femora black above, brownish testaceous below, the tibiæ and tarsi of four anterior legs entirely dull testaceous. Posterior femora black, tibiæ ferruginous, dark brown above on apical half, the tarsi rufotestaceous, second, third and fourth abdominal segments entirely black.

Tenthredo xanthus Nort.

One ♀, July 24, on flowers of *Heracleum lanatum* (T. D. A. Cockerell). This specimen has the head, thorax and abdomen more truly ferruginous than the types from Colorado, they being yellowish ferruginous.

Allantus unicinctus Nort.

Two ♂ ♂, one Aug. 13 (T. D. A. and W. P. Cockerell). One specimen has the antennæ almost black, in the other we have the next step to the yellow, joints five, six, seven, eight and nine being a dark yellowish brown beneath.

CIMBICIDÆ.

Trichiosoma triangulum Kby.

One ♂. Differs from the description in having antennæ black, except joints four and five, which are brownish and by black of abdomen being confined to first and second segments. John's Canon, June 25 (T. D. A. Cockerell).

Zarsæa americana Cress.

Two, May 30, 1902 (T. D. A. and W. P. Cockerell).

The following description of a new bee of the genus *Sphecodes*, is contributed by T. D. A. Cockerell:

Sphecodes fragariæ Ckll., n. sp.—Length about 6 mm.; black, including legs; abdomen red, black at apex; mandibles strongly bidentate. Closely related to *S. mandibularis* Cresson (an Illinos specimen from Mr. Robertson compared), but differs as follows:

S. fragariæ.	*S. mandibularis.*
Mandibles black, extreme tip reddish.	Mandibles ferruginous.
Antennæ longer, reaching considerably beyond tegulæ.	Antennæ short, only reaching tegulæ.
Tegulæ piceous.	Tegulæ dark brown.
Wings more or less dusky, especially on apical margin; stigma and nervures black.	Wings clear; stigma and nervures dark brown.
Ridges of metathoracic enclosure weaker.	Ridges of metathoracic enclosure very strong.
Sides of metathorax coarsely rugose.	Sides of metathorax cancellate.
Apex of abdomen black, the black well defined from the red; a black spot on base of third segment.	Apex of abdomen suffusedly blackish.

S. fragariæ was taken at Beulah, N. M., May 3, 1902 (T. D. A. and W. P. Cockerell), visiting flowers of *Fragaria* (wild strawberry).

DIPTERA OF BEULAH, NEW MEXICO.

BY C. W. JOHNSON.

Pachyrrhina erythrophrys Will., Kan. Univ., ii., 63.

A male collected by Dr. Skinner has the abdominal segments, second to the seventh inclusive, a bright orange-red, except for a narrow lateral and posterior margin of black. Two males collected by Mr. Henry L. Viereck, June 29, vary somewhat from the typical form and from the one collected by Dr. Skinner in having the second, third and fourth and the basal third of the fifth segment in one, and the fifth and sixth in the other red. Two of the three male specimens in my collection from Bear Creek, Col., collected by Mr. E. J. Oslar, show the same variation; the other being typical.

Mr. Viereck also obtained a female at Beulah, which has not been heretofore described. It closely resembles the male except in the color of the abdomen. The second segment has a broad basal band of red and a narrower one separated by about an equal width of black; segments three to seven inclusive have a sub-basal red band about one third the width of the segment; that on the seventh segment somewhat smaller and interrupted; the bands do not reach the lateral margin. Ovipositor dark brown. Length of ♂ 14 mm., ♀ 19 mm.

Aspistes analis Kirby, Fauna Br, Amer., 311, Tab. v, fig. 8.

This seems to differ from the typical form in having no lateral line of red on the thorax.

Chilosia skinneri n. sp.—♀ Head black; eyes glabrous; sides of the face yellow and covered with a whitish pubescence, leaving a broad, shining medial stripe; front and vertex shining, the former with a spot of white pubescence on the lower corners bordering the eye; antennæ reddish, the upper edge of the third joint dark brown, aristæ black and bare. Thorax black, the dorsal portion shining and sparsely covered with very fine white hairs; humeri with a whitish bloom; pleuræ with a tuft of white hairs in front of the base of the wing; scutellum with two slight bristles; halteres white. Abdomen shining black, rather slender, with very fine white hairs. Legs, including coxæ, a uniform lighter yellow. Wings hyaline, with a light brownish tinge. Length 5½ mm.

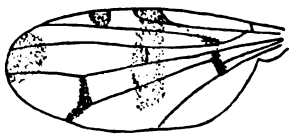
One specimen, Beulah, N. M., August 17.

Cuterebra similis n. s.—Head black, with five more or less triangular pollinose spots on each side contiguous with the eyes, the two occupying the ex-

treme lower angles of the front are fully double the size of those above; those on the face are about equal in size, the upper ones being triangular, the others of nearly a uniform width; the spots on the inferior orbits are much longer, with a very narrow margin extending upwards along the posterior orbits adjoining the eyes; face and front subshining, punctate and rugosely plicate, and sparsely covered with fine black hairs; vertex with a brownish tinge; antennæ black; the plumose aristæ becoming yellowish towards the tip. Thorax a bluish-black, shining, with fine black hairs, pleuræ densely covered with long black hair, with only a small tuft of yellow hair below the base of the wing; scutellum more thickly covered with hair than the dorsal portion of the thorax. Abdomen shining, steel-blue, sides of the first three segments partly yellowish pollinose, leaving numerous isolated or connected spots of the ground color; along the posterior margin of the first and anterior margin of the second it extends well towards the dorsum. Legs black; the femora somewhat brownish, with a white pollinose spot at the base of the posterior femora and on the outer side at the base of all the tibiæ. Wings, alulæ and squamæ, dark brown. Length 21 mm.

One ♀, Beulah, New Mexico. This species nearest related to *C. atrox* Clark, from which it is readily separated by having the last segment entirely steel blue, and not sprinkled with irregular markings of yellowish pollen.

Zonosema ? dubia n. sp.—Head yellow, the face and orbital portions somewhat lighter than the front and vertex; antennæ yellow, ocellar tubercle black. Thorax and scutellum reddish brown, bristles black, humeri and pleuræ yellow. Abdomen dark brown. Legs yellow. Wings hyaline, with a slight clouding along the basal transverse veins and towards the stigma; a large cross-band extends from the stigma across the marginal and submarginal cells, on each side of the middle transverse vein, across the discal cell to the middle of the third posterior cell; the clouding along the posterior transverse vein continues along the fifth longitudinal vein to the margin; a large spot occupies the apical portion, while a much smaller spot is situated in the marginal cell midway between the end of the first and second longitudinal veins. Length 4 mm., wing 4 mm.



Beulah, N. M., August 17.

The following descriptions are contributed by D. W Coquillett:

TROCHILODES, new genus.

Near *Trichopora*, but the third antennal joint slender and elongated, palpi present, proboscis setaceous, etc. Head nearly square, as long at vibrissæ as at base of antennæ, sides of face bristly, vibrissæ slightly above anterior oral margin, proboscis two and a half times as long as height of head, rigid, very slender, the labella also rigid

and very slender, palpi very short, clavate; antennæ four-fifths as long as face, the third joint narrow, slightly over three times as long as the second, arista pubescent, the penultimate joint slightly longer than broad; eyes bare, cheeks one half as wide as the eye-height, ocellar bristles directed forward; third vein bristly nearly half way to small cross-vein, other veins bare, third vein ending far before the extreme tip of wing, first posterior cell closed, its petiole about one-fourth as long as the hind cross vein, bend of fourth vein nearly rectangular and furnished with a long stump of a vein, hind cross-vein much nearer bend of fourth vein than to the small cross-vein, last section of fifth vein less than one third as long as the preceding section.

Type, the following species:

Trochilodes skinneri n. sp.—Black; the frontal vittæ dark brown; first two joints of antennæ and base of the third yellowish brown; middle and lower part of sides of face and the cheeks, also the palpi, yellow; front one and one-half times as wide as either eye; two pairs of orbital bristles; frontal bristles in single rows, scarcely descending below base of antennæ; sides of face each bearing about two irregular rows of stout bristles extending from the front nearly to the vibrissæ; facial ridges bristly on the lowest fourth; arista thickened on its basal three-fifths; body opaque, gray pruinose; the fourth abdominal segment very thinly pruinose, somewhat polished; mesonotum with a pair of interrupted subdorsal black vittæ, three pairs of postsutural dorso-central bristles, three sterno-pleurals; abdomen on first three segments with olivaceous, changeable spots, the last three segments with discal and marginal bristles; middle tibiæ bearing three stout bristles on the outer anterior side, the same on the outer-posterior side and one below middle of inner side; hind tibiæ not ciliate; pulvilli elongated; wings hyaline; calypteres white. Length 9 mm.

One specimen, Beulah, New Mexico. August 17th. Type received for naming from C. W. Johnson, of Philadelphia, to whom, by request, it has been returned.

Pegomyia nitidula n. sp.—*Male.*—Black; the halteres yellow; eyes approximate; frontal vitta at narrowest point slightly wider than the lowest ocellus; front and epistoma not prominent; antennæ slightly shorter than the face, the third joint a trifle longer than the second; arista with a short pubescence; sides of face and lower corners of front whitish pruinose; proboscis moderately robust; mesonotum opaque, grayish black pruinose; the region of the humeri light gray; abdomen depressed, polished, not grayish pruinose; hypopygium large; venter without processes and long bristles; front tibiæ bearing a bristle on the inner-posterior side; middle tibiæ with one on the outer-anterior, two on the outer-posterior and two on the inner-posterior side; middle femora bristly on the basal two-thirds of the under side; hind femora bristly on the apical three-fourths of the under side; hind tibiæ bearing a small bristle on the

inner-anterior side, three large ones on the outer-anterior, two very small ones on the inner-posterior side and four large ones on the outer-posterior side, besides those at the tip; wings grayish hyaline; the base to beyond the humeral cross-vein brown; spines of costa small; calypteres yellowish white. Length 4.5 mm.

Female.—Præocellar bristles present; front tibiæ bearing a bristle on the outer-anterior and one on the inner-posterior side, middle tibiæ with two on the inner-anterior, three on the outer-anterior, two on the inner-posterior, and two on the outer-posterior side; spines of costa rather large, otherwise as in the male, except the sexual characters.

Beulah, New Mexico (Coquillett). A specimen of each sex collected August 17.

LIST OF DIPTERA.

ABBREVIATIONS.

The first letter after a species denotes the determiner, and the next letter or letters the collector.

Coq.—Coquillett, D. W.
J.—Johnson, C. W.
C.—Cockerell, T. D. A.
V.—Viereck, H. L.
A.—Aldrich, J. M.
S.—Skinner, H.
M. D. C.—Cockerell, M. D.
W. P. C.—Cockerell, W. P.
Ch.—Chapman.

TIPULIDÆ.

Dicranomyia halterata *O. S.* Coq., C.
defuncta *O. S.* Coq., C.
Limnobia triocellata *O. S.* Coq., C.
Erioptera septentrionalis *O. S.* Coq., C.
Molophilus colonus *Berg.* Coq., C.
hirtipennis *O. S.* Coq., C.
Eriocera spinosa *O. S.* Coq., C.
Tipula fallax *Loew.* Coq., C.
bicornis *Forbes.* Coq., C.
Pachyrrhina ferruginea *Fabr.* J., V.
erythrophrys *Will.* J., S. V.

CULICIDÆ.

Culex impiger *Walk.* Coq., C.
reptans *Meig.* Coq., C.

PSYCHODIDÆ.

Pericoma bipunctata *Kinc.* Coq., C.

CHIRONOMIDÆ.

Chironomus brunneus *Walk.* J., V.

MYCETOPHILIDÆ.

Dynatosoma fulvida *Coq.* Coq., C.
Lasiosoma fasciata *Say.* Coq., C.
Mycetophila ichneumonea *Say.* Coq., C.
Sciara nigra *Wied.* Coq., C.
Dilophus stigmaterus *Say.* J., S.
Aspistes analis *Kirby.* J., S.

LEPTIDÆ.

Symphoromyia fulvipes *Bigot.* Coq., C.

STRATIOMYIDÆ.

Sargus decorus *Say.* Coq., C.
viridis *Say.* Coq., C.
Stratiomyia barbata *Loew.* Coq., C.

TABANIDÆ.

Chrysops noctifer *O. S.* J., V.
Therioplectes rhombicus *O. S.* J., V.

BOMBYLIDÆ.

Spogostylum œdipus *Fabr.* Coq., C.
Anthrax catulina *Coq.* Coq., C.

Anthrax alternata *Say*. J., S.
hypomelas *Maca*. Coq., C.
fulviana *Say*. J., S.
sinuosa *Wied*. J., S.
Anastœchus barbatus *O. S.* J., S.
Sparnopolius coloradensis *Grt*. Coq., S.

ASILIDÆ.

Cyrtopogon leucozonus *Loew*. J., S.
montanus *Loew*. Coq., C.
Dasyllis posticata *Say*. Coq., C.
Laphria xanthippe *Will*. Coq., C.
anthrax *Will*. J., Ch.
Mallophora clausicella *Macq*. J., S.
Erax varipes *Will*. J., C.
Tolmerus callidus *Will*. J., C. S.

EMPIDÆ.

Hilara atra *Loew*. Coq., C.

DOLICHOPODIDÆ.

Dolichopus plumipes *Scop*. A., S.
coloradensis *Aldr*. Coq., C.
Psilopus melanopus *Loew*. Coq., J.; C. S.

SYRPHIDÆ.

Pipiza pisticoides *Will*. Coq., C.
modestus *Loew*. J., V.
Chilosia tristis *Loew*. Coq., C.
skinneri *Johnson* n. sp.
Hammerschmidtia ferruginea *Fall*. Coq., M. D. C.
Melanostoma mellinum *Linn*. Coq., M. D. C.
Syrphus arcuatus *Fall*. Coq.
pullulus *Snow*. J., S.
ribesii *Linn*. Coq., C.
genualis *Will*. J., C.
Chamæsyrphus williston *Snow*. Coq., C.
Catabomba pyrastri *Linn*. Coq., C.
Sphærophoria cylindrica *Say*. J., S.
Sericomyia militaris *Walk*. J., V.
Eristalis tenax *Linn*. J., S
latifrons *Loew*. Coq., C.
Xylota flavitibia *Bigot*. J., S.
pigra *Fabr*. Coq., C.
notha *Will*. Coq., C.

CONOPIDÆ.

Physocephala burgessi *Will*. Coq., J., C., S.
texana *Will*. Coq., C.
Zodion fulvifrons *Say*. J., S.
splendens *Jæn*. Coq., C.
Oncomyia baroni *Will*. J., S.

ŒSTRIDÆ.

Cuterebra americana *Fabr*. Coq., S.
similis *Johnson*. n. sp.
lepivora *Coq*. Coq., C.

TACHINIDÆ.

Cistogaster immaculata *Macq*. Coq., C.
Myiophasia ænea *Wied*. Coq., C.
Thryptocera atripes *Coq*. Coq.; C. S.
Hypostena tortricis *Coq*. C.
Epigrimyia occidentalis *Coq*. Coq., S.
Clausicella setigera *Thom*. Coq., C.
Siphona geniculata *Dr. Greer*. Coq., C.
Chætogædia crebra *v.d. Wulp*. Coq., C.
Frontina archippivora *Will*. Coq., C.
Trochilodes skinneri *Coq*., n. gen. et sp.
Lasioneura johnsoni *Coq*. Coq., C.
Linnæmyia picta *Meig*. Coq., C.
Panzeria radicum *Fabr*. Coq., C.
Cuphocera californiensis *Macq*. Coq., C.
Gonia capitata *Dij*. Coq., C.
Peleteria robusta *Wied*. J., C.
tessellata var. neglecta *Town*. C.
Archytas lateralis *Macq*. Coq., M. D. C.
analis *Fabr*. J., C.
Echinomyia algens *Wied*. Coq., C
decisa *Walk*. Coq., C.
hystricosa *Will*. Coq., C.
Epalpus bicolor *Will*. Coq., C.
Parepalpus flavida *Coq*. Coq., C.
Dejeania hystricosa *Will*. Coq., C.
vexatrix *O. S.* C.

DEXIDÆ.

Myocera tibialis *Desv*. Coq., S.
rava *v. d. Wulp*. Coq., C.
Prosena curviostris *Bigot*. Coq., C.

MUSCIDÆ.

Calliphora vomitoria *Linn*. J., S.
Phormia regina *Meig*. J., C.
Morellia micans *Macq*. Coq., C.

ANTHOMYIDÆ.

Phorbia platura *Meig.* Coq., C.
Pegomyia nitidula *Coq.* n. sp. S.
cilicrura *Rond.* J., S.
Schœnomyza dorsalis *Loew.* Coq.; C. V.

SCATOPHAGIDÆ.

Scatophaga suilla *Fabr.* Coq., C.

HELOMYZIDÆ.

Anorostoma marginata *Loew.* J., S.
Helomyza tincta *Walk.* Coq., C.
zetterstedtii *Loew.* Coq., C.

SCIOMYZIDÆ.

Neuroctena fumida *Coq.* Coq., C.
Tetanocera canadensis *Macq.* Coq., C.
plumosa *Loew.* Coq., C.

SAPROMYZIDÆ.

Pachycerina verticalis *Loew.* Coq.; C.S.

ORTALIDÆ.

Tritoxa cuneata *Loew.* Coq., C.

TRYPETIDÆ.

Zonosena flavonotata *Macq.* Coq., C.
dubia *Johnson* n. sp. S.
Straussia longipennis *Wied.* Coq., C.
Trypeta occidentalis *Snow.* Coq., C.
Tephritis genalis *Thoms.* Coq., C.
finalis *Loew.* J., S.
Paracantha culta *Wied.* Coq.; C. V.
Euaresta abstersa *Loew.* J., S.
Urellia mevarna *Walk.* J., S.

SEPSIDÆ.

Sepsis violacea *Meig.* J.; C. S.

OSCINIDÆ.

Chlorops assimilis *Macq.* J., S.
Meromyza americana *Fitch.* Coq., C.
Gaurax epphippium *Zett?* Coq., S.
Siphonella lævigata *Fall.* J., S.

AGROMYZIDÆ.

Agromyza coronata *Loew.* J., S.
æneiventris *Fall.* J., S.
setosa *Loew.* Coq., C.
Leucopsis nigricornis *Egger.* Coq., W. P. C.
(with aphides on *Senecio.*)

BORBORIDÆ.

Aptilotus politus *Will.* Coq., C.

HEMIPTERA of Beulah, New Mexico.

BY EDWARD P. VAN DUZEE.

HETEROPTERA.

Homœmus æneifrons Say.

Several examples.

Perillus exaptus Say.

One large specimen. This has a crimson band between the humeri; and the anterior edge of the pronotum, the margin of the scutellum, and the costa narrowly, is fulvous.

Corimelæna nitiduloides Wolff.

One example.

Euschistus inflatus n. sp.—Size and general aspect of *servus* to which it is closely related. Head about as in *servus* with the punctures finer; the lateral lobes slightly longer than the tylus, depressed, with the edges a little reflexed. Pronotum more depressed anteriorly, and particularly within the middle of the lateral margins than in *servus*, the sides rather deeply sinuated, and crenulated anterior to the middle; humeral angles subacutely rounded; surface finely punctured, more obscurely so across the middle of the disk, the punctures segregated toward the lateral margins and forming a blackish patch behind the anterior angles and several small spots before the callousities, or there may be four black dots in a square on the anterior middle; median line obscurely lævigate. Scutellum more closely punctured, but less so than in *servus*: the apex much broader and more rounded. Elytra rather sparsely and finely punctured, especially on the discal area, the whole surface dotted with little groups of black punctures. Membrane dark grey, dotted with fuscous, the nervures concolorous. Connexivum with square blackish spots against the incisures, on which the punctures are pale. Whole lower surface pale yellow, punctured and flecked with rufous. Stigmata, and sometimes two punctures behind them, black. Edge of the abdomen with a conspicuous black dot at each incisure. Legs rufous, more or less punctured with darker and with about four larger black dots on each femora beneath; the spines on the anterior femora very small. Rostrum as in *servus*, reaching to the hind coxæ, the tip and a median line beneath black. Antennæ rufus, fifth joint and apex of the fourth dusky, second and third subequal. Length 11-13 mm. Width across the humeri 7-8 mm.

Described from 12 examples taken by Prof. E. D. Ball in Colorado; and one specimen collected in Beulah, New Mexico, August 17th, by Dr. Henry Skinner. This species is closely related to *servus* but may be readily distinguished by the rufous color beneath, the depressed pronotum, with an obscure longitudinal smooth line,

the more rounded apex of the scutellum, and the finer punctures over the whole upper surface. The dotting of the elytra is quite characteristic but perhaps should not be depended upon. *Euschistus conspersus* described by Dr. Uhler in 1899, is surely very close to this species, but he gives the second joint of the antennæ in his species as much shorter than the third, the apex of the scutellum narrow, bordered with white, and the pleura with uncolored punctures, none of which characters will fit this species at all; the size given for *conspersus* is also a little less and the form more slender. This interesting addition to our North American fauna is apparently confined to the Rocky Mountain region.

Alydus scutellatus n. sp.—Small, greyish above, scutellum deep velvety black, nervures of the membrane anastomosing. Length to tip of membrane 9 mm. Head proportionately a little broader before the antennæ, and the vertex more convex, with the ocelli placed farther back than in *eurinus* and *conspersus;* bronze black, with a median longitudinal line above, a more slender abbreviated lateral line before and a little above the base of the antennæ, and a short oblique line behind and beneath the eyes, soiled white or pinkish. Antennæ fuscous, a little paler on the basal half of the first three joints, these joints subequal in length; apical joint black, little longer and stouter than in *eurinus*. Rostrum reaching to the intermediate coxæ, minutely touched with pale at the intermediate incisures. Pronotum bronze-black, coarsely punctured, marked on the posterior lobe with four or six pale vittæ, more or less distinct; a median longitudinal velvety black line from the collar almost to the base; posterior margin very narrowly edged with pale around the humeral angles and before the middle of the scutellum; surface almost flat posteriorly, a little depressed within the humeral angles. Scutellum deep velvety black, with the tip of its upturned apex pale. Elytra pale or tinged with pinkish, punctured and irregularly varied with blackish. Membrane bronze-black, becoming paler exteriorly, the nervures strong, irregular and somewhat reticulated and branched in places. Beneath shining bronze-black, the propleura coarsely punctured, the calloused edges of the coxal orifices, a median spot on the second, and the hind edge of the sixth segment, yellowish or tinged with pink. Genital segment black, polished, with a large median fulvous spot. Legs black, with the tips of the coxæ, knees and basal half of the first tarsal joint, pale. Posterior femora more slender than in any of our other species, with four large spines and a few minute ones beneath marked near the apex with an obscure pale band. Disk of the tergum rufous posteriorly. Connexivum with a small pale marginal spot near the base of each segment.

The claspers of the male are strap shaped and curved almost in a semi-circle, approximating at their apex which is a little wider and slightly reflexed at the upper angle. In *conspersus* the claspers are narrowed toward their apex and approach at an angle making a pear-shaped opening. In *eurinus* they are broader with a smaller

orifice. The whole insect is clothed with minute hairs about as in *conspersus*.

Described from two males collected by Dr. Henry Skinner, Aug. 17th, at Beulah, New Mexico. This is the smallest *Alydus* known to me. It may be distinguished from *conspersus*, its nearest ally, by the undotted membrane, with anastomosing nervures, the more slender hind femora, with a pale annulus before the apex, and many of the other characters enumerated above.

Corizus hyalinus Fabr.

One specimen of the variety *viridicatus* Uhler.

Corizus novæboracensis Sign.

One specimen, somewhat mutilated, seems to belong to this species. I have a slightly paler example taken by Prof. Wickham at Kalispell, Mont., and a more typical male from British Columbia. An extension of its range along the Rocky Mountains to New Mexico would not be surprising.

Lygæus turcicus Fabr.

Two examples.

Nysius angustatus Uhler.

Several examples.

Ligyrocoris balteatus Stal. ?

Seven examples. This species was described from Mexico and has not before been recorded from the United States. The present specimens differ from Stal's description in having the posterior lobe of the pronotum almost black with four ferruginous spots on the hind margin, the intermediate of which may be extended anteriorly. These are also brachypterous, a feature not mentioned by Stal.

Miris affinis Reut.

One specimen.

Leptopterna dolobrata Linn.

Two examples of the pale form of this widely distributed European species were doubtless taken about the cultivated fields, in which situations they occur throughout Colorado and Utah.

Lomatopleura cæsar Reut.

Several specimens taken.

Calocoris superbus Uhler.

Five examples.

Resthenia rubrovitta Stal.

One example.

Phytocoris interspersus Uhler.

One pale example. This specimen has four brown dots on the hind edge of the pronotum. The two black dots at the tip of the scutellum seem to be characteristic of this delicate species.

Compsocerocoris annulicornis Reut.

Two adults and one larva. These adults are quite distinctly mottled with darker on the elytra and have a white median line on the vertex and pronotum, and the third joint of the antennæ want the pale annulus. Otherwise they do not seem to differ from Reuter's description.

Pœciliocapsus lineatus Fabr.

Nine specimens. Some of these show the black markings greatly reduced. In one or two individuals the subcostal vitta is entirely wanting, the sutural is narrow and interrupted, and the triangular spots at the base of the pronotum are barely indicated.

Lygus pratensis Linn.

Several examples of a small dark variety.

Camptobrochis grandis Uhler.

Three examples.

Stiphrosoma stygica Say.

Five specimens.

Plagiognathus obscurus Uhler.

Several examples.

Piezostetus sordidus Reut.

One example differs from Reuter's description only in being a little larger.

Apiomerus crassipes Fabr.?

One female example I have placed here with some doubt. The pronotum is black with the posterior margin behind the humeral angles narrowly edged with whitish, the connexivum is black with

a pale spot at each incisure, and the corium is dark sanguineous with the hind edge and costa narrowly pale.

Coriscus ferus Linn.

One strongly marked specimen. This widely distributed species seems to follow cultivation and irrigation throughout the arid region of the West.

Corisens sp.

There is one example of another species I have not been able to locate. This is a difficult genus and sadly needs revision.

Hygrotrechus remigis Say.

Two examples.

Notonecta sp.

One immature example.

HOMOPTERA.

Ceresa turbida Godg.

Eight male and five female examples.

Thelia univittata Harris.

One male and three females.

Microcentrus perdita Am. & Serv.

Four examples. I found this species not uncommon in Colorado on the lower branches of the scrub oaks where they lay close to the ground.

Aphrophora irrorata Ball.

An interesting species of which there are two specimens in the lot.

Clastoptera obtusa Osborn.

Five male and four female examples. While collecting in Colorado I took this species only on pine on the mountain sides.

Clastoptera xanthocephala Germ.

Two examples. These are of the black form which I have taken to be the characteristic type of the species. The color above, especially on the pronotum, is of an intense shining black ; a transverse line on the base of the vertex, another near the fore margin of the pronotum, and two converging lines on the scutellum, are clear

bright yellow. There is also a yellowish vitta on the suture between the corium and clavus. The hyaline spots on the costa and apex of the elytra are narrow, and there is an indication of a yellowish annulus about the gibbous area on the elytra. Face fulvous with a black disk. Legs yellow, annulated with black. This is a very different looking insect from the pale testaceous form described by Prof. Ball in his synopsis of the genus Clastoptera as *xanthocephala*. Although so different in coloring they may represent forms of one species. The variation which seems to be in color only is perhaps no greater than we find in *Clastoptera proteus* Fitch.

Oncometopia costalis Fabr.

Apparently common. Fifteen examples were taken.

Tettigonia hieroglyphica Say.

Thirteen examples.

Helochara communis Fitch.

Two examples.

Gypona melanota Spanbg.

One immature specimen determined by Prof. E. D. Ball.

Idiocerus lachrymalis Fitch.

One female.

Idiocerus suturalis Fitch.

One female of the form with the maculated elytral suture.

Phlepsius cumulatus Ball.

Six examples. This stout little species seems to be quite abundant throughout the mountains of Colorado and the adjacent States.

The following description of a new Coccid from Beulah is contributed by Wilmatte P. Cockerell and T. D. A. Cockerell.

Phenacoccus vipersioides n. sp.— ♀ Length about .2 mm. Plump, of ordinary form, pale salmon-pink, appearing somewhat white from a mealy secretion; not so mealy below, hence pinker. Margin with an irregular but distinct fringe of cottony tassels, short caudal tassels.— Boiled in liquor potassæ turns a deep claret color. Labrum dimerous long. 129 μ, lat. 90 μ. Skin with many small glands and sparsely hairy. Each segment has on each side a small group of two spines and several round glands. Legs large and sparsely hairy, about six hairs in each longitudinal row on tibia; femur slender. Middle leg:

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Six examples. This stout little species seems to be quite abundant throughout the mountains of Colorado and the adjacent States.

The following description of a new Coccid from Beulah is contributed by Wilmatte P. Cockerell and T. D. A. Cockerell.

Phenacoccus vipersioides n. sp.— ♀ Length about .2 mm. Plump, of ordinary form, pale salmon-pink, appearing somewhat white from a mealy secretion; not so mealy below, hence pinker. Margin with an irregular but distinct fringe of cottony tassels, short caudal tassels.— Boiled in liquor potassa turns a deep claret color. Labrum dimerous long. 129 μ, lat. 90 μ. Skin with many small glands and sparsely hairy. Each segment has on each side a small group of two spines and several round glands. Legs large and sparsely hairy, about six hairs in each longitudinal row on tibia; femur slender. Middle leg:

femur + trochanter 2.10; tibia 1.65; tarsus 75; width of femur about 60 μ.; caudal bristles 300 μ.; bristles of anal ring 105 μ. Besides the long caudal bristles, there is a more slender bristle (210 μ. long) on each side, arising from the same patch. Antennæ 9-jointed, formula 932 (58), 47 (16). Joints: (1) 30, (2) 48, (3) 51, (4) 39, (5) 42, (6) 30, (7) 33, (8) 42, (9) 66 μ.

Beulah, N. M., about 8,000 feet with *Lasius niger*. This is certainly a *Phenacoccus*, having 9-jointed antennæ, lateral patches of spines, and the claws with a small denticle on the inner side. The presence of the pairs of caudal bristles (as in *Halimococcus* and *Phœnicococcus*) is interesting. The insect closely resembles *Ripersia salmonacea*, Ckll.

Additional records from Prof. Cockerell:

ABBREVIATIONS.

The first letter after a species denotes the determiner, and the next letter or letters the collector.

H.—Heideman, O.
C.—Cockerell, T. D. A.
B.—Ball, E. D.
U.—Uhler, P. R.
W. P. C.—Cockerell, W. P.

HETEROPTERA.

Lygus plagiatus *Uhler*. H., C.
sallei *Stal*. B., C.
Scolopostethus thomsoni *Reut*. H., C.
Peribalus limbolarius *Stal*. B., C.
Harmostes reflexulus *Stal*. B., C.
Resthenia insitiva *Say*. B., C.
rubrovittata *Stal*. U., C.
Lopidea media *Say*. B., C.
Agalliastes associatus *Uhler*. B., C.
Alydus eurinus *Say*. B., C.
(Dailey Canon.*)
Coriscus ferus *Linn*. B., C.
Calocoris superbus *Uhler*. U., S.

HOMOPTERA.

Aphrophora annulata *Ball*. B., C.
Necterophora rudbeckiæ *Fitch*. C., C.
Cyrtolobus fenestratus *Th*. B., C.
Chermes abietis *Linn*. C., C.
Aphis valerianæ *Cowen*. C., C.
veratri *Cowen*. C., C.
chenopodii *Cowen*. C., C.
Pemphigus populimonilis *Kiley*. C., C.
Charitophorus populicola *Thomas*. C.,C.
Phenacoccus rubivorus *Ckll*. C., C.
milmatæ *Ckll*. C., W. P. C.
ripersioides *Ckll*. n. sp.
Ceroputo calcitectus *Ckll*. C., C.
Orthezia occidentalis *Douglas*. C., C.
(On roots of *Fragaria*.)
Ripersia cockerellæ *King*. C., C.
Dactylopius neomexicanus *Tinsley* var. C., W. P. C.
Kermes gilletei *Ckll*. C., n.

* Dailey Canon is over the ridge, northeast of Blake's Ranch.

APHIDIDÆ.

BY T. D. A. COCKERELL.

Siphocoryne pastinacæ (Linné).

Beulah, N. M., July 26, and in vast numbers August 2, on fruiting umbles of *Heracleum lanatum*.

Winged ♀: pale dull green; dorsum of head, mesothorax and scutellum, shining black; a large square black patch on middle of abdomen, followed by three transverse black bars. Legs pale greenish, ends of tarsi black. Stigma dark brown. Antennæ, nectaries and cauda short. Mesosternum black; a black patch on under side of abdomen near tip. Young, apple green with black eyes; some specimens are pink.

The species has not been recorded from America under the above name, but I believe *S. archangelicæ* Oestlund is a synonym. I wanted to believe that the celery aphid figured in Bull. 102, Michigan Agr. Exp. Sta., p. 20, was also *Siphocoryne*, but while the venation agrees, the antennæ are much too long.

Aphis epilobii, Kalt.

Beulah, N. M., on a flowering head of *Epilobium angustifolium*; extremely abundant, covering the whole surface. Attended by *Farmica sanguinea*.

Winged ♀: entirely black, the abdomen shining; anterior legs more or less pallid; beak scarcely reaching middle coxæ; antennæ shorter than body; ventral surface of thorax olive brown to black, of abdomen usually dull dark sage green; wings hyaline, stigma blackish or pale. Pupa with wing-pads has a pale brown head and thorx, and dark slate abdomen. Apterous form dark slate-color, white-pruinose; basal two-thirds of antennæ, nectaries and legs (except tarsi) whitish or yellowish-white. Very young vary from slate gray to pale orange, and occasional half-grown examples are brownish orange.

The species is new to America.

Aphis chenopodii Cowen.

Beulah, N. M., August 5, on *Chenopodium album*, curling the leaves.

Winged ♀: head and thorax black, abdomen green without spots. Opterous form light green, pulverulent; eyes black (reddish in younger ones); cauda quite long; nectaries short, slender; legs pale yellowish, tarsi blackish. The antennal joints of the winged form measure in μ. (3.) 320, (4.) 160, (5.) 160, (6a.) 120, (6b.) 215.

Aphis veratri Cowen.

Beula, N. M., July 27, etc., abundant on leaves of *Veratrum*.

Apterous form black; basal half of antennæ (except extreme base); anterior femora and all the tibiæ dull white.

Aphis valerianæ Cowen.

Beulah, N. M., July 27, on *Valeriana;* very abundant.

Apterous form slaty black, including legs, etc.; more or less distinct whitish spots on back. One specimen of an olive-black *Nectarophora* was found with them.

Aphis rociadæ n. sp.

Rociada, N. M., August 8; very numerous on leaves and stems of *Delphinium sapellonis.*

Apterous ♀: small, broad and swollen, very shiny, bright orange-scarlet to dark red. No obvious cauda; nectaries very short, but larger than broad, black at ends; head blackish; antennæ blackish, third joint paler; legs brown. Mounted examples are pale ferruginous, slightly over 1½ mm. long; nectaries about 150 μ. long, slightly bulging toward the bases. Antennal joints in μ.; (4.) 200, (5) 170, (6a.) 80, (6b.) 340. Younger example shows (1) 70, (2.) 60, (3.) 320, (4.) 130, (5a.) 80, (5b.) 290.

A very distinct and beautiful species; I brought some alive from Rociada,* and established a colony at Beulah.

Aphis atronitens n. sp.

Rociada, N. M., August 10; abundant on *Vicia* aff. *pulchella.*

Winged ♀: shining black; wings hyaline, nervures and stigma colorless or barely tinged with yellow; legs pale greenish; nectaries long; beak hardly reaching middle coxæ; cauda rather long, slender. Measurements in μ.: nectaries, 300; cauda, 100; anterior tarsus, 130; antennal joints (3.) 280 or more, (4.) 250–280, (5.) 240–260, (6.) 140. (6b.) 230. Joint 3 with few sensoria, 4 with none. (In *A. epilobii*, a black species found in the same region, joints 3 and 4 are crowded with large sensoria.)

Apterous form plump, gray-black, shining; legs very pale yellowish, the tarsi, end of tibiæ, and apical two-fifths of hind femora, black; antennæ with joints 3 and 4 whitish; nectaries black.

Young, dark gray. *A. atronitens* reminds one of the English *A. fabæ*, which is said to be identical with *A. rumicis.* The characters of the antennæ readily distinguish *A. atronitens* from *A. rumicis.* In mounted specimens the bicoloration of the legs is conspicuous.

Myzus phenax n. sp.

Beulah, N. M.; very abundant on flowering racemes of *Humulus lupulus* var. *neomexicanus*, first found by my wife July 28. Attended by *Formica.*

Winged ♀: body about 2 mm., wings about 3 mm.; mounted specimens (in balsam) are dark brown, with dark red eyes, but in life the colors are as follows: head and thorax black; abdomen dull green, with lateral black spots, and dorsum

* Rociada is just over the hill from Beulah.

marbled with black; nectaries black pointed inwards; wings hyaline, stigma pale gray; antennæ black; beak falling a little short of middle coxæ; anterior legs pale ochreous, with black knees and tarsi; four hind legs with femora and tarsi black, tibia pale ochreous. Measurements in μ.: nectaries 300 long, 70 broad; cauda 170; marginal cell with substigmatal portion 300; poststigmatal 500; antennal joints, (3.) 480, (4.) 260, (5.) 210, (6a.) 100, (6b.) 300. Joint 3 crowded with sensoria, 25 or more; 4 without sensoria.

Apterous form stout, dull green (mounted specimens dark brown), clouded obscurely with a darker blue green; nectaries black, directed outwards; legs yellowish with black tarsi; hind femora with distal half clouded with blackish. The sides of the back exhibit some very small black spots. Antennæ with the basal half mostly pale yellowish, apical half black. Lateral tubercles as described in *M. neomexicanus*. No capitate hairs.

When I first saw this, I thought I had *Phorodon*, but none of the specimens can possibly be referred to that genus. The insect is a *Myzus* closely related to *M. neomexicanus*. It has a strong superficial resemblance to *Aphis gossypii*, which Pergande records from *Humulus*, but it can easily be distinguished by the numerous and crowded sensoria on the third antennal joint, *A. gossypii* having only five to seven.

Nectarophora agrimoniella *Ckll.*, ined.*
on Agrimonia. Color green.

Nectarophora corallorhizæ *Ckll.*, ined.*
on Corallorhiza multiflora.

Nectarophora solidaginis (*Fabr.*).
on Solidago.

Nectarophora rudeckiarum *Ckll.*, ined.*
on Rudbeckia. Color green.

Nectarophora heleniella *Ckll.*, ined.*
on Helenium hoopesii. Color green.

Nectarophora martini *Ckll.* ined.* Color dark wine red; immature forms with a bluish bloom. Cauda ensiform; nectaries black; stigma tapering; femora with apical portion black; third antennal joint with at least 40 prominent sensoria.
on Helenium, Frasera, Zygadenus, Eriogonum, Potentilla and Ligusticum.

Macrosiphum rubicola *Oestlund.*
on Rubus strigosus.

* Descriptions will appear in Canadian Entomologist.

ERRATA AND ADDITIONS.

(LEPIDOPTERA.)

Page 37, *add* Thecla melinus *Hub.*
" 37, *read* Peridroma saucia.
" 37, *add* Feltia volubilis *Harvey.* Sm., C.
Noctua conchis *Grt.* Sm., Mrs. Blake.
Carneades redimicula *Morr.* Sm., C.
Carneades ochrogaster *Gn.* Sm., C.
Carneades brunneigera *Morr.* Sm., C.
Carneades lutulenta *Sm.* (var.). Sm., C.
Hadena violacea *Grt.* Sm., C.
Toxocampa victoria *Grt.* Sm., C.
Orneodes hexadactyla *Linn.* C., C.
Pterophorus sulphureodactylus *Pack.* Busck.
Argyresthia andereggiella *Dup.* Busck.

(COLEOPTERA.)

Page 38, for Calasoma *read* Calosoma.
" 39, *read* Geodromicus ovipennis.
" 39, *read* Hippodamia convergens.
" 39, *read* Scymnus ardelio.
" 39, *read* Erotylus boisduvalii.
" 39, *read* Epurœa papagona.
" 39, of those marked † only a few were collected by Miss Mary Cooper.
" 40, *read* Monohammus maculosus.
" 41, *read* Otidocephalus estriatus.
" 41, *read* Gnathotrichus.

(ORTHOPTERA.)

Page 42, read *Bacillus coloradus.*

(NEUROPTERA.)

Page 43, *add* Perlinella frontalis *Banks*, coll. W. P. Cockerell.

(HYMENOPTERA.)

Page 51, *read* **Panurginus atricornis.**
" 55, " *Potentilla pulcherima.*
" 57, " " "
" 64, " " "
" 67, " **Mimesa basirufa.**
" 67, " " **punctata.**
" 67, " **Bembex nubilipennis.**
" 71, " **Tetrachrysis.**
" 72, " **Tapinoma.**
" 73, " **Formica pallide-fulva.**
" 81, " **Spilocryptus neomexicanus.**
" 81, " **Limnerium australe.**
" 82, " **Limnerium tæniolatum.**
" 92, " *L. flavicinctum.*

DESCRIPTIONS OF NEW ANT-LIKE AND MYRMECOPHILOUS HYMENOPTERA.

BY CHARLES THOMAS BRUES.

Laboratory of the U. S. Fish Commission, Woods Hole, Mass Sept. 6, 1902.

The present descriptions and notes are based upon Hymenoptera collected while searching for ants and myrmecophiles. As many insects not associated with ants are found at such times, only those are included which are evidently myrmecophilous or which resemble ants in form and habitus. All of the ten new species belong either to the Proctotrypoidea or Ichneumonidæ, two groups rich in myrmecophilous and ant like species.

NORTH AMERICAN SPECIES OF PEZOMACHUS.

Females.

Head black or piceous ..... 2.
Head rufous or yellowish ..... 12.
2. Thorax at least in part black or piceous ..... 3.
Thorax wholly reddish ..... 10.
3. Thorax uniformly piceous brown or black ..... 4.
Thorax bicolored ..... 8.
4. Abdominal petiole wholly black ..... 5.
Abdominal petiole with pale band at apex ..... 7.
Abdominal petiole brown, antennæ stout .....4. **californicus** Ashm.
5 Legs, including coxæ, wholly reddish or yellowish ..... 6.
Legs, or at least coxæ and femora black; antennæ 18-jointed.
1. **nigrellus** Ashm.
6. Anterior lobe of thorax longer than the posterior one; antennæ 19-jointed.
2. **obesus** Ashm.
Posterior lobe longer than anterior .....**alaskensis** Ashm.
7. Lateral tubercles of abdominal petiole not prominent; ovipositor as long as the petiole; antennæ 21-jointed .....5. **pettitii** Cress.
Lateral tubercle very prominent; ovipositor as long as first two abdominal segments; antennæ 22-jointed .....6. **angularis** sp. nov.
8. Thorax with anterior node ferruginous, posterior one more or less black .. 9.
Thorax black, with ferruginous antennæ 19-jointed.
8. **maculicollis** sp. nov.
9. First abdominal segment with prominent tubercles and scarcely dilated behind them; antennæ 23-jointed .....9. **gentilis** Cress.
First abdominal segments broad with inconspicuous tubercles, and much dilated behind them; antennæ 20-jointed .....10. **wheeleri** sp. nov.
10. First segment only of abdomen pale .....7. **tantillus** Cress.
First two of abdominal segments at least in part pale .....11.

11. First and second abdominal segments wholly yellowish; antennæ 22-jointed 11. **canadensis** Cress.
First segment wholly yellowish, second pale banded...12. **obscurus** Cress.
12. Frst abdominal segment very long and unusually slender, scarcely dilated at tip; antennæ 21-jointed .....13. **texanus** Cress.
Head and thorax dark, abdomen except petiole dark. var. **nigriventris.**
First abdominal segment not unusually slender..... 13.
13. Abdomen wholly ferruginous, sometimes very slightly infuscated.... .. 14.
Abdomen in great part black or piceous ..... 15.
14. Ovipositor as long or longer than the abdomen; antennæ 24-25-jointed. 14. **unicolor** Cress.
Ovipositor a little longer than the abdominal petiole, antennæ with more than 23 joints .....15. **crassulus** sp. nov.
Ovipositor very short; antennæ 19-26 jointed..... .....**keeneli.**
15. Small species, 2.5 mm. or less, first and second abdominal segments rufous; antennæ 18-jointed .....17. **minimus** Walsh.
Larger, over 4 mm., or differently colored..... 16.
16. Ovipositor very short, third and following segments pale behind. **alternatus** Cress.
Ovipositor at least about as long as the first abdominal segments..... 17.
17. Anterior lobe of thorax with a median longitudinal groove; antennæ 24-jointed .....19. **dimidiatus** Cress.
Anterior lobe of thorax not thus sulcate.... .... 18.
18. Tip of abdomen pale .... 22.
Tip of abdomen dark or banded ..... 19.
19. Abdominal petiole black, with a yellow apical band; tip of abdomen piceous. 20. **meabilis** Cress.
Petiole rufous or ferruginous .... 20.
20. Tip of abdomen banded ..... . .21. **micariæ.**
Tip of abdomen black ..... 21.
21. Antennæ 23-jointed ....22. **ottowaënsis.**
Antennæ more than 23-jointed .....23. **flavocinctus** Ashm.
22. Petiole much dilated apically; second, third and fourth segments ferruginous; antennæ 19-jointed..... .....25. **birkmani** sp. nov.
Petiole but slightly dilated; third and fourth segments more or less fuscous; antennæ 25-jointed .....26. **gracilis** Cress.

Males.

Apterous ..... 2.
Winged ..... 5.
2. First abdominal segment very long and slender, scarcely dilated apically, considerably longer than the metathorax ....13. **texanus** Cress.
First abdominal segment shorter and broader ... ... 3.
3. Head black; small species..... ... ... 4.
Head yellowish brown; antennæ 27-jointed..... ....27. **macer** Cress.
4. Abdomen wholly black; antennæ 20-jointed ... .**nigrellus** Ashm.
Abdomen pale banded..... .....17. **minimus** Walsh.

5. Head and thorax black ..... 6.
Head black; prothorax, legs and abdomen, except apex, yellowish or ferruginous.....9. **gentilis** Cress.
6. Black, with segments 2 and 3 of abdomen yellowish.....**ottowaënsis.**
Head, thorax and abdomen above black.....28. **insolitus** How.
Head and thorax dull black, abdomen wholly rufous....21. **micarise** How.

Pezomachus Birkmani sp. nov.

Female.—Length 3.5 mm.—Slender, yellowish ferruginous, except a piceous spot at the base of the abdominal petiole, narrow piceous band at base of third abdominal segment, black tips of mandibles and infuscated apical joints of antennæ. Antennæ stout, 19-jointed, somewhat thickened toward the apex, almost as long as the body, their joints shorter than usual, the eighth flagellar joint being no longer than wide. The joints annulate with black from third joint, the rings becoming wider and the joints wider apically. Ocelli equidistant, the posterior ones about equidistant from one another and the eyes, each ocellus surrounded by a very small elongate black spot. Thorax more sharply constricted than usual between meso- and metathorax. Mesonotum not impressed, its lateral dentiform processes distinct, the dorsum evenly but not very convex and much longer than the metathorax. Metathorax rather sharply declivous behind, more sharply convex anteriorly, its posterior face very finely rugose, separated from the dorsum by a fine raised line which is interrupted medially. Abdominal petiole rather long, its lateral teeth large and distinct. Abdomen more shining than the head and thorax, ovate, first and second segments yellow ferruginous; a piceous band at the base of the third; following segments darker. Legs yellowish ferruginous. Ovipositor about one and one-half times as long as the abdominal pedicel.

A female specimen collected at Fedor, Lee County, Texas, by Rev. G. Birkman, on April 1, 1901.

This species comes near to *alternatus* Cress., and like it has the antennal joints unusually short. It differs from the latter in having a long ovipositor which extends beyond the tip of the abdomen for a distance considerably greater than the length of the petiole of the abdomen.

Pezomachus maculicollis sp. nov.

Female.—Length 2.5 mm. Black, with ferruginous markings. Head black, not shining; face below antennæ ferruginous except for a longitudinal stripe below each antennæ. Mandibles reddish black at the bidentate tips. Palpi fuscous. Antennæ pale ferruginous, with dark incisures at the joints and blackened on apical fourth, 19-jointed. Cheeks fuscous below. Thorax black, not shining; collar rufous on the sides, mesonotum with a ferruginous V-shaped spot pointing anteriorly, a small ferruginous spot each side of the apex of the V. Metathorax with two ferruginous dorsal spots. Posterior lobe of the thorax much more strongly and sharply convex than the anterior lobe and about as long. Posterior face of metathorax bordered by a sharp carina, finely rugose; thorax elsewhere delicately punctate. Scutellum absent. Abdomen piceous black, subclavate; first segment rather short and broad and gradually dilated posteriorly; piceous-brown

in front and yellowish behind. Second and following segments shining piceous, with a few short white hairs, second very narowly reddish posteriorly. Ovipositor exceeding tip a little more than length of first abdominal segment. Legs luteous, more or less darkened on the coxæ, femora and tibiæ.

Described from a female specimen collected in nest of *Leptothorax longispinosus* Roger. *P. maculicollis* is readily recognized by its small size and by the ferruginous markings on the thorax. It evidently mimics the ant with which it lives, resembling it greatly in size, color and general habitus.

I have also a single ♂ and ♀ collected at Woods Hole, Mass., which belong perhaps to this species. The thoracic spots are very faint in the ♀, which has 20-jointed antennæ and more distinct tubercles on the petiole than *P. maculicollis*. The apterous male has also 20-jointed antennæ and a narrow scarcely dilated black petiole. The legs are slightly darker than in the ♀.

Fezomachus texanus Cress.

This species occurs at Austin, Texas, associated with the ant *So lenopsis geminata* Fabr. A male specimen collected by Dr. William M. Wheeler in a nest of the same ant at Corpus Christi, Texas, proves to be wingless. It differs from the female in having the antennæ almost as long as the body; the head entirely honey yellow; scutellum very distinct (it is very faintly separated in the female). The pedicel and whole abdomen, as well is much elongated. The antennæ are 22-jointed; they are 21-jointed in the female.

Var. *nigriventris*.—Several females from Austin Texas, differ from the typical form in having the head and thorax dark ferruginous, and the whole abdomen behind the petiole shining black.

Pezomachus angularis sp. nov.

Female.—Length 2.75 mm. Small, slender, black. Tip of petiole and abdomen pale. Head shining, rather densely and finely punctured; black above, deep yellow in front below the antennæ and below on the cheeks behind. Mandibles and palpi luteous, the former black at the tips. Antennæ slightly longer than the body, 22-jointed, yellowish at base and infuscated apically. Thorax slender, the anterior and posterier lobes very nearly equal, the posterior one more strongly arched; fuscous or piceous brown, lighter on the sides of the pro- and mesothorax. Mesonotum finely punctured, not sulcate. Metathorax more coarsely punctured, especially behind, without any keels. Abdominal petiole with its lateral tubercles very prominent, behind which it is constricted and then widens out to the apex, where it is no wider than at the tubercles. Petiole piceous, paler at base and with a luteous band at apex. Abdomen elongate oval, rather slender, scarcely wider than the head; shining and sparsely finely sericeous pubescent. Second to

fifth segments piceous black, apical segments pale yellowish. Legs dark fuscous, trochanters, sutures and apices of tarsi paler. Ovipositor as long as first and second segments together, ferruginous.

Described from one female specimen collected at Austin, Texas, May, 1902.

This species resembles *Pettitii*, but is smaller and has a differently formed abdominal petiole.

Pezomachus crassulus sp. nov.

Female.—Length 4.5 mm. Large and stout, ferruginous, slightly infuscated on the abdomen. Head ferruginous, slightly darker on the occiput, rather finely punctate and not at all shining, very sparsely silvery pruinose. Face considerably produced just at the base of the antennæ. Mandibles deep yellow, black at the tips; palpi rufous. Antennæ short, stout (broken), thickened toward the tips and probably reaching about to the base of the second abdominal segment. Rufous at base, paler and with dusky incisures toward the tip; with at least 23 joints. Thorax short and stout, less strongly bilobed than usual, the lobes of equal length, ferruginous. Mesonotum sculptured like the head. Metanotum indistinctly areolated in front, distinctly so behind. Petiole gradually widened out towards its apex, the lateral tubercles not prominent; longitudinally aciculated above and sparsely covered with sericeous pubesence. Abdomen very shining, sparsely punctulate and thinly pubescent; broadly oval; ferruginous except at the base of the second and third segments where it is slightly infuscated. Legs dark ferruginous throughout.

Described from a single female collected under a stone at Austin, Texas, during April, 1902.

This fine species resembles *unicolor* Cress. in color, but is readily separated by the characters given in the table, and by its opaque head and thorax.

Pezomachus Wheeleri sp. nov.

Female.—Length 3.5 mm. Rather stout, black, with reddish markings. Head large, black, finely punctured, mandibles black; palpi testaceous, cheeks smooth and very shining, face not produced at the base of the antennæ. Antennæ piceous, paler towards base, especially below; 20-jointed. Thorax strongly bilobed; anterior lobe dark ferruginous, with darker humeral marks; posterior one black; slightly ferruginous on the anterior upper face. Posterior lobe longer and more convex. Mesonotum slightly longitudinally impressed medially, metanotum smooth, very finely shagreened, with a delicate carina laterally, which is interrupted above. Abdominal petiole very short and broad, gradually dilated to the apex, dark rufous. Its lateral tubercles not at all prominent; abdomen very broad behind the petiole, regularly oval; shining black, except for the narrow dark yellow border of the second segment and a faint trace of narrower light borders on the third and fourth segments. Ovipositor exceeding the apex of the abdomen by the length of the petiole. Its sheaths pale at base and piceous at tips. Legs piceous, the trochanters, knees, anterior tibiæ at tip, and all the tarsi more or less rufotestaceous.

Described from a female specimen collected at Rockford, Ill., by Dr. William M. Wheeler, to whom I take great pleasure in dedicating this species.

1. *Nigrellus*,	1.5-2	mm.	Alaska.	15. *Crassulus*,	4.5	"	Tex.
2. *Obesus*,	3.5	"	Alaska.	16. *Keeni*,	3-4	"	B. C.
3. *Alaskensis*,	2.6	"	Alaska.	17. *Ninimus*, Mo., Ill.	2-2.5	"	Tex.,
4. *Californicus*,	2.4	"	Cala.	18. *Alternatus*,	4.5	"	Ill.
5. *Pettiti*,	3.5	"	Ontario.	19. *Dimidiatus*,	4.25	"	Mass., Ill.
6. *Angularis*,	2.75	"	Tex.	20. *Meabilis*,	3.	"	Ill
7. *Tantillus*,	2.25	"	Ill.	21. *Micariæ*,	5-6	"	D. C.
8. *Maculicollis*,	2.5	"	Ill.	22. *Ottawaensis*,	5-6	"	Canada.
9. *Gentilis*,	3.	"		23. *Flavocinctus*,	4.	"	Tex.
10. *Wheeleri*,	3.5	"	Ill.	24. *Berkmanni*,	3.5	"	Tex.
11. *Canadensis*,	3.25	"	Canada.	25. *Gracilis*,	5.	"	Pa.
12. *Obscurus*,	3.25	"	N. J.	26. *Macer*,	5.	"	Pa.
13. *Texanus*,	4.	"	Tex.	27. *Insolitus*,	5.	"	Pa.
14. *Unicolor*, Del., Ill.	4-4.5	"	Mass.,				

Ateleopterus virginiensis Ashm.

I have two wingless females of this species collected at Round Rock, Texas; the species was originally described from Virginia.

Mesitius myrmecophilus sp. nov.

Female.—Length 3.2 mm. Black, shining, with sparse pale hairs; antennæ and legs brown; wings slightly infuscated. Head scarcely longer than wide, shining black, with widely separated, but very distinct punctures; sparsely covered with rather long whitish hairs. Antennæ 13-jointed, reaching to the tegulæ, dark ferruginous at base, fuscous at tip. Scape short and stout, scarcely equalling one-half the greatest width of the head; pedicel more slender, but scarcely longer than the first flagellum joint. Following three joints quadrate, beyond which they are very slightly longer than wide; apical joint slender, twice as long as wide. Palpi and mandibles ferruginous, the latter dark at extreme tip. Pronotum sparsely and more finely punctured than the head, shining and with short pale hairs, considerably longer than the mesonotum and scutellum taken together; tegulæ ferruginous. Mesonotum impunctate, with two fine longitudinal grooves, which enlarge posteriorly and meet the two large foveæ at the base of the scutellum. Metanotum with a lateral and a median fine raised line and a fainter one between these anteriorly which fades out behind; delicately reticulate. Posterior face with median and lateral raised lines very sharp, separated from the metanotum by a similar line; very finely transversely rugoso-aciculate. Abdomen polished black, impunctured, pale hairy on posterior half. Sixth segment ferruginous at tip. Wings hyaline, basal veins yellow; stigma and radius fuscous. Second basal cell without a backwardly directed vein. Marginal cell long and widely open at tip. Legs rufopiceous.

Described from a ♀ specimen collected in a nest of *Eciton cæcum* at Austin, Texas.

The present species is a typical representative of the genus, and comes nearest to *M. nigropilosus* Ashm. in form, but has pale pubescence and a longer pronotum. It differs from the other species in the form of the head and antennæ.

Gonatopus peculiaris sp. nov.

Female.—Length 2.75-3 mm. Polished black, except the greater part of head, sutures of legs and base of antennæ, which are reddish or yellow. Head distinctly less than twice as wide as long, ferruginous, except a transverse black band between the eyes on the vertex. Mandibles except tips and antennal scape luteous; pedicel and sometimes base of first flagellar joint yellow; remainder of antennæ black. Mesonotum smooth, shining, *evenly arched above* and not emarginate when seen in profile. Metathorax transversely striated before and behind, smooth at the middle. Abdomen polished black. Legs varying from piceous to ferruginous, the coxæ and sutures paler, often luteous. Entire insect very sparsely white pubescent.

Described from four ♀ specimens collected near Austin, Texas, in the early spring. They were seen actively running about on the ground, some near the bank of a stream and the others on dry hillsides. I have also collected *G. bicolor* Ashm. at Granite Mt., Tex., under stones, and *G. contortulus* Patton upon low herbage, near Woods Hole, Mass., in the same surroundings as the specimens described by Dr. Patton.

This interesting species resembles *G. contortulus* Patton in form and color, but differs from it as well as from the other species of *Gonatopus* in lacking the V-shaped emargination upon the mesonotum.

Idris nigricornis sp. nov.

Male.—Length 2.5 mm. Polished black, legs and antennal scape basally rufous; sparsely covered with pale pubescence. Head shining, very faintly shagreened. Eyes pubescent, lateral ocelli remote from the eye; mandibles rufous. Antennæ black, except the base of the slender scape, which is rufous; pedicel very small, globular; first flagellar joint large, one and one-half times as long as broad, following joints moniliform, slightly smaller than the first; apical joint longer, obtusely pointed. Thorax very sparsely and finely, but sharply punctate; mesonotal furrows deep posteriorly, fading out anteriorly. Pleuræ coarsely punctured in front, polished behind. Scutellum with a punctate frenum and a similar row of punctures along its anterior margin. Metathorax finely rugose, its lateral teeth small and acute. First two abdominal segments longitudinally striate, abdomen elsewhere smooth and shining, rather closely pale pubescent. Legs varying from brown to deep yellow or rufous. Wings hyaline, fringed; basal vein not very distinct, the marginal about three times as long as thick, postmarginal equal to marginal; stigmal twice as long and knobbed at tip.

Described from three ♂ specimens, bred in an artificial nest from a mixed colony of *Myrmica* and *Leptothorax* at Colebrook, Conn., August, 1901.

Caloteleia Marlattii Ashm.

I have numerous specimens of this widely distributed species which were bred by Dr. Wm. M. Wheeler in a mixed nest of *Myrmice* and *Leptothorax* at Colebrook, Conn., August 10, 1901, as well as specimens from Woods Hole, Mass.

All of the males have the abdomen pale at the base, and the third abdominal segment smooth, otherwise they agree well with the description of this species.

Hemilexodes ambigua sp. nov.

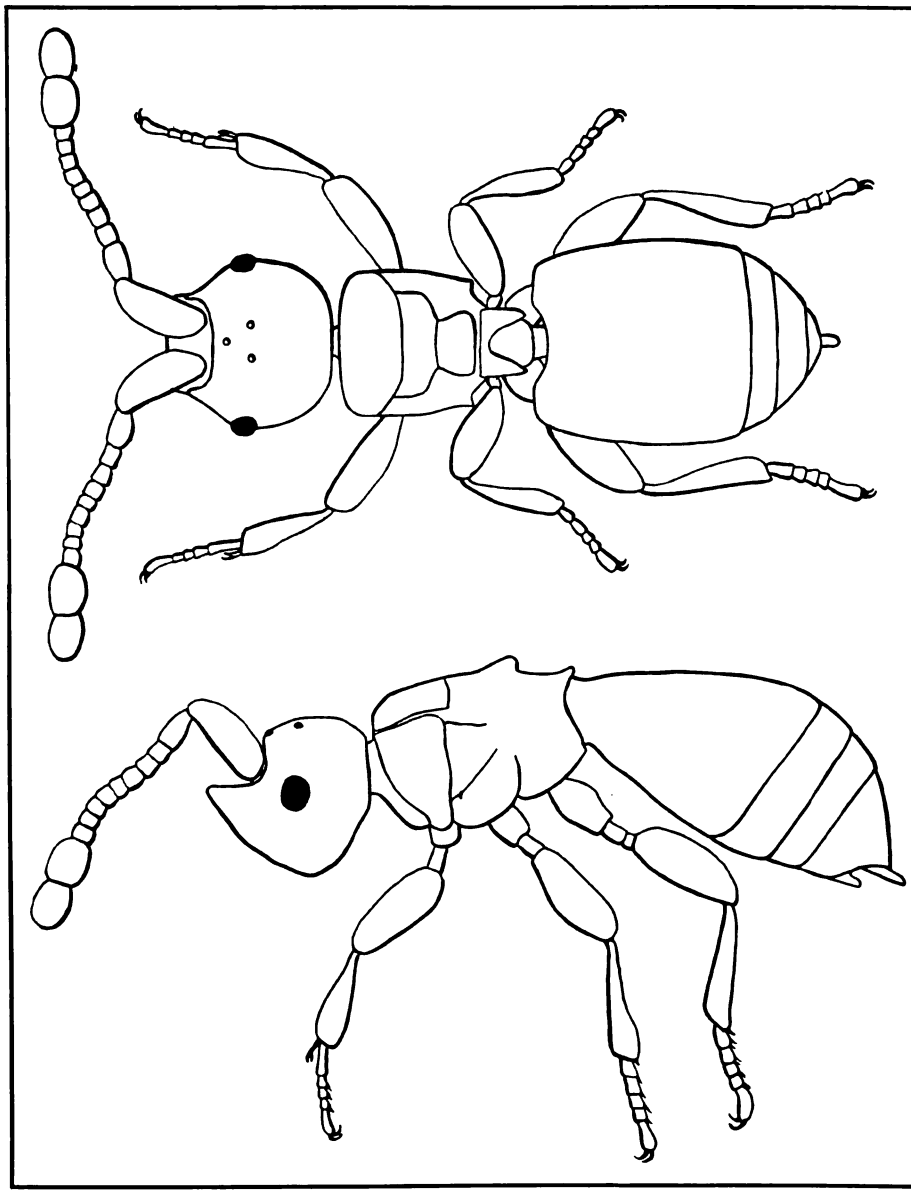
Female.—Length 2.5 mm. Black shining, legs and antennæ, except apex, rufous. Head sparsely pale pilose; mandibles entirely rufous. Antennal scape reaching about to the posterior ocelli, pedicel stouter than first flagellar joint, but of equal length. Second flagellar joint scarcely more than half as long as the first, then the joints become slightly shorter to the fifth which is submoniliform; following joints forming a loosely articulated, 6-jointed spindle-shaped club. The apical joint more slender than penultimate, but longer. Mesonotum sparsely pale hairy, with two distinct furrows. Scutellar fovea deep and broad, its surface longitudinally fluted. Metathorax wooly, coarsely sculptured. Petiole about two and one-half times as long as thick, finely longitudinally striated. Abdomen very shining, black, the petiole below and the base of the second ventral segment sometimes yellowish or rufous. Second segment twice as long as the remaining segments; the abdomen obliquely subtruncate at the apex. Legs yellowish or rufous. Wings strongly fringed, only a slight indication of an emargination at the apex. Stigmal vein about two times as long as the very short marginal vein. Postmarginal vein about half as long as the stigmal.

Described from two female specimens, collected in a nest of *Stenamma fulvum* var. *piceum* at Colebrook, Conn., where it, no doubt, lives parasitically upon myrmecophilous dipterous larvæ.

I have been doubtful whether this species belongs more properly to *Hemilexis* Först, or to *Hemilexodes* Ashm., as it presents characters of each, and again departs somewhat from both in the form of the antennæ and venation.

AUXOPÆDEUTES gen. nov. (see Plate I).

Head orbicular, much produced in front to form a sort of shelf at the base of which the antennæ are inserted. Seen from the side the projection is triangular, with a horizontal upper surface. Antennæ 12-jointed, clavate, the last two joints much enlarged, the penultimate the longest; scape rather short, equal to the last two flagellar



AUXOPÆDEUTES SODALIS GEN. ET SP. NOV.

joints, pedicel as long as the first and second joints of the flagellum. Mandibles bidentate; maxillary palpi 3-jointed, labial 2- (possibly one) jointed. Head narrowed in front of the eyes, the antennal projection about twice as wide as long, sharply rounded on the corners. Eyes greatly reduced, much smaller than the last joint of the antennæ and with few ommatidia. Ocelli large, prominent and arranged in an equilateral triangle upon the vertex, enclosing a space about equivalent to the eye. Thorax quadrate, slightly produced at posterior angles; prothorax nearly half as long as wide, truncate in front rounded behind; mesonotum narrower than pronotum, about three times as wide as long. Wings wholly absent. Scutellum trapezoidal, rounded on the posterior angles; metathorax deeply emarginate in the center, forming two rather acute backwardly directed teeth. Abdominal petiole short. Abdomen somewhat shorter than the head and thorax; basal segment twice as long as the remainder of the abdomen, broadly emarginate at the base, widest just behind the middle. Third and fourth segments about equal, short; last longer. Legs short and stout; femora, especially the four posterior ones, considerably swollen, spur of anterior tibiæ stout and bifid at the tip; those of the other legs not well developed.

Auxopædeutes sodalis sp. nov.

Female.—Length 1.25 mm. Fuscous, head piceous, antennæ and legs ferruginous. Body quite hairy, the hairs longest and thickest on the antennæ and the posterior part of the abdomen. Head and thorax smooth and impunctured. Abdomen with a large deep semi-circular depression at base, sharply bounded in front by the raised anterior margin of the second segment, and rounded behind, almost as wide as the base of the abdomen. First segment obliquely striate at its anterior lateral corners, the abdomen elsewhere smooth and convex.

Described from a female specimen collected by Dr. Wm. M. Wheeler on the banks of Bull Creek, Travis Co., Texas. It was found in a nest of *Solenopsis molesta*, and is undoubtedly a true myrmecophile of this minute ant.

The form of the antennæ recall somewhat those of *Solenopsia* Wasmann, but the insect is otherwise quite different and I have not been able to determine its systematic position with any degree of assurance, placing it in the Diapriidæ, although it resembles members of the Belytidæ in having a large pronotum, The antennæ resemble those of the Diapriidæ in having 12 joints. The number of antennal joints in ant-nest inhabiting forms tends to be unusual,

however, and the antennæ often resemble greatly those of the host ant; as is seen in this case to a remarkable degree. For this reason the form of the antennæ may not be so valuable for classification as other characters.

The general habitus of this form is like that of *Solenopsia imitatrix* Wasmann, a peculiar proctotrupid which occurs in the nests of *Solenopsis fugax* in Europe, and it is interesting to note the occurrence of this somewhat similar form with our North American *Solenopsis molesta*, which resembles *S. fugax* in habits. It is apparently the first myrmecophile which has been found living with this species of *Solenopsis*, which is itself a facultative myrmecophile of other species of ants.

NOTES ON WEST INDIAN ORTHOPTERA, WITH A LIST OF THE SPECIES KNOWN FROM THE ISLAND OF PORTO RICO.

BY JAMES A. G. REHN.

The material on which this study is based is contained in the collections of the United States National Museum and the Academy of Natural Sciences of Philadelphia; the collections of the respective institutions are designated in the following paper by their initials. Permission to examine the National Museum material was secured through the kindness of Mr. W. H. Ashmead of that institution. All material from Porto Rico, unless otherwise stated, was collected by Mr. August Busck of the U. S. Department of Agriculture.

Family FORFICULIDÆ.

Anisolabis annulipes (H. Lucas).

One female; Fajardo, Porto Rico. February, 1899. (U. S. N. M.)

Anisolabis maritima (Gené).

Two males; Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Anisolabis azteca (H. Dohrn).

Three males, thirteen females:
Utuado, Porto Rico, January, 1899. (U. S. N. M.)
Arroyo, Porto Rico, February, 1899. (U. S. N. M.)
Bayamon, Porto Rico, January, 1899. (U. S. N. M.)
Fajardo, Porto Rico February, 1899. (U. S. N. M.)
Mayaguez, Porto Rico, January, 1899. (U. S. N. M.)
Ponce, Porto Rico, April 16th. (U. S. N. M.)
Jamaica. (A. N. S. P.)

Labidura riparia (Pallas).

One male, four females; Fajardo, Porto Rico. February, 1899. (U. S. N. M.)

Apterygida gravidula (Gerstaecker).

Three males, one female; Aguadilla, Porto Rico. January, 1899. (U. S. N. M.)

Apterygida buscki n. sp.

Type: ♀; Utuado, Porto Rico. January, 1899. Collected by August Busck.

Allied to *A. percheron* (Guérin) from Cayenne and St. John, West Indies, but differing in the small exposed portion of the wings, the greater size and the entire absence of ochraceous coloration from the insect, the general tint being dull blackish brown.

Size medium; body moderately depressed, subfusiform. Head cordiform, antennæ moniliform, 15-16 jointed. Pronotum subquadrate, the anterior and lateral margins straight, the posterior rotundate; centrally with a longitudinal depression. Elytra rather elongate, posteriorly subtruncate, the surface slightly scabrous. Wings projecting beyond the elytra as slight truncate plates. Abdomen considerably wider than the width across the elytra, the lateral folds but slightly developed; anal segment transverse with a central longitudinal sulcus; pygidium small; forceps straight with the apex falcate, quadrate in section at the base, inner margin with blunt denticules.

General color deep blackish brown, becoming fuscous on the lower portions of the limbs. Antennæ with two joints (12-13) ochraceous.

MEASUREMENTS.

Total length	21.5 mm.
Length of pronotum	2.7 "
Length of elytra	3.7 "
Length of forceps	4.5 "

Two paratypes have been examined of this species, which I take pleasure in dedicating to my friend, Mr. August Busck, who collected the series. One female from El Yunque, Porto Rico, collected in February by Dr. C. W. Richmond was also examined.

Family BLATTIDÆ.

Phyllodromia bivittata Serville.

One specimen; Fajardo, Porto Rico. February, 1899. (U. S. N. M.)

Phyllodromia punctulata (Palisot).

One specimen; Utuado, Porto Rico. January, 1899. (U. S. N. M.)

This specimen appears to be identical with the insect figured by Palisot, who recorded the species from San Domingo.

Phyllodromia delicatula Guérin.

One specimen; Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)

Nyctibora mexicana Saussure.

One specimen; Jamaica. (A. N. S. P.)

Periplaneta americana (Linnæus).

Three specimens; Jamaica. (A. N. S. P.)

Periplaneta australasiæ (Fabricius).

One specimen; Jamaica. (A. N. S. P.)

Plectoptera porcellana (Saussure).

One specimen; Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)

Plectoptera poeyi (Saussure).

One specimen; Vieques Island, Porto Rico. February, 1899. (U. S. N. M.)

Leucophæa maderæ (Fabricius).

One specimen; Bahama Islands. (A. N. S. P.)

Pycnoscelus surinamensis (Linnæus).

Two specimens; Jamaica. (A. N. S. P.) Fajardo, Porto Rico. February, 1899. (U. S. N. M.)

Panchlora peruana Saussure.

One specimen; Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Panchlora virescens (Thunburg).

One specimen; Porto Rico. January 18, 1899. Paul Beckwith. (U. S. N. M.)

Panchlora exoleta (Burmeister).

Four specimens; Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Blaberus atropos (Stoll).

Six specimens; Santiago de Cuba. February 24, 1902. S. H. Hamilton. (A. N. S. P.)

Blaberus rufescens (Saussure).

One specimen; Porto Rico. (A. N. S. P.)

Family MANTIDÆ.

Stagmomantis dimidiata (Burmeister).

Five males; Jamaica. (A. N. S. P.)

Callimantis antillarum (Saussure).

Two males, two immature specimens; Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Theoclytes cingulata (Drury).

One male; Jamaica. (A. N. S. P.)

This rare species is strictly an Antillean form, and the records from So. America, as shown by Saussure and Zehntner (Biol. Cent.-Amer., Orth., i, p. 192), belong to another species.

Family PHASMIDÆ.

Lamponius portoricensis n. sp.

Type: ♀; Fajardo, Porto Rico. February, 1899. Collected by August Busck. (U. S. N. M.)

Apparently a member of this genus, but not closely related to *L. guerini* (Saussure) the type. It differs in the smaller size, the granulate head and thorax, and the differently shaped apex of the abdomen.

Form thick and heavily built. Head somewhat flattened, the region between the antennal bases with an elevated transverse ridge, the basioccipital region with several low tubercles; dorsal joint of the antennæ flattened, the upper surface undulate. Pronotum almost quadrate, the lateral margins carinate and spined, centrally with two longitudinal rows of tubercles of three each. Mesonotum about three times as long as the pronotum, with a longitudinal median carina, the surface tuberculate. Metanotum with the median segment slightly shorter than the mesonotum, posteriorly expanding. Abdomen slightly tapering, the superior terminal plate transverse, the posterior margin rounded. Femora very short, the median pair of limbs equalling the metanotum and median segment in length, the posterior pair of limbs reaching the apex of the second abdominal segment. Tibiæ shorter than their respective femora. Tarsus with the three basal joints subequal.

General color dull yellowish green, the antennæ with the apical portions of the large segments bearing a more or less distinct blackish blotch.

MEASUREMENTS.

Length of head and body	32. mm.
Length of mesonotum	7.5 "
Length of metanotum (with median segment)	.5 "
Length of anterior femora	5.5 "
Length of median femora	5.5 "
Length of posterior femora	5.5 "

Bacunculus dryas (Westwood).

One male; Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)

Clonistria sp.

One female; Jamaica. (A. N. S. P.)

Aplopus jamaicensis (Drury).

Two females; Jamaica. (A. N. S. P.)

Family ACRIDIDÆ.

Paratettix frey-gessneri Bolivar.

One female; Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

Orphulella punctata (De Geer).

Two females:
St. Vincent. (A. N. S. P.)
Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

Plectrotettix gregarius (Saussure).

Eleven males, twenty three females, two nymphs:
Utuado, Porto Rico. January, 1899. (U. S. N. M.)
Arroyo, Porto Rico. February, 1899. (U. S. N. M.)
Bayamon, Porto Rico. January, 1899. (U. S. N. M.)
Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)
Vieques Island, Porto Rico. February, 1899. (U. S. N. M.)
Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)

This species can readily be separated from *P. viatorius* (Saussure) of Mexico by its smaller size, and more angulate fastigium when viewed laterally. The latter character is quite striking.

Sphingonotus jamaicensis Saussure.

Two females; Jamaica. (A. N. S. P.)

Sphingonotus haitensis (Saussure).

Two females:
Arroyo, Porto Rico. February, 1899. (U. S. N. M.)
Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Schistocerca americana (Drury).

Two males, four females:
Bayamon, Porto Rico. January, 1899. (U. S. N. M.)
Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)
Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

Schistocerca ægyptia (Thunberg).

Six males, nine females:
Bayamon, Porto Rico. January, 1899. (U. S. N. M.)
Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)
Vieques Island, Porto Rico. February, 1899. (U. S. N. M.)
Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)
Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

Family TETTIGONIDÆ.

Microcentrum triangulatum Brunner.

Two females:
Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

This form was previously known only from Guadeloupe and St. Thomas.

Conocephalus guttatus Serville.

One male and one female; Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Conocephalus macropterus Redtenbacher.

Two females:

Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Porto Rico. January 18, 1899. Paul Beckwith. (U. S. N. M.)

Xiphidion fasciatum (De Geer).

Four males, six females:

Jamaica. (A. N. S. P.)

Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Arroyo, Porto Rico. February, 1899. (U. S. N. M.)

Mayaguez, Porto Rico. January, 1899. (U. S. N. M.)

Rio Piedras, Porto Rico. June, 1902. O. W. Barrett. (A. N. S. P.)

Jamaicana vittata Brunner.

One immature specimen; Jamaica. (A. N. S. P.)

Family GRYLLIDÆ.

Scapteriscus didactylus (Latreille).

Twelve specimens:

Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Utuado, Porto Rico. January, 1899. (U. S. N. M.)

Fajardo, Porto Rico. February, 1899. (U. S. N. M.)

Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Porto Rico. January 18, 1899. Paul Beckwith. (U. S. N. M.)

Rio Piedras, Porto Rico. February 25, 26 and 28, 1902. Otis W. Barrett. (A. N. S. P.)

Ellipes minuta (Scudder).

Three specimens; Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Gryllus assimilis Fabricius.

Three males, two females:

Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Porto Rico. January 18, 1899. Paul Beckwith. (U. S. N. M.)

Gryllodes muticus (De Geer).

Two males, one female:

Rio Piedras, Porto Rico. May, 1902. O. W. Barrett. (A. N. S. P.)

Vieques Island, Porto Rico. February, 1899. (U. S. N. M.)

Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Gryllodes poeyi (Saussure).

One male, one female:

El Cobre, Santiago Prov., Cuba. February 22, 1902. S. H. Hamilton. (A. N. S. P.)

Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

Amphiacusta caraibea Saussure.

One male; Culebra Island, Porto Rico February, 1899. (U. S. N. M.)

This specimen agrees perfectly with Saussure's description of this species from Guadeloupe, except in the shape of the lower margins of the lateral lobes of the pronotum, which are diagonally emarginate instead of "subrecto" as Saussure describes them.

Anaxipha pulicaria (Burmeister).

One female; Culebra Island, Porto Rico. February, 1899. (U. S. N. M.)

Cyrtoxipha imitator Saussure.

One male; Santa Ana, Santiago Prov., Cuba. March 4, 1902. S. H. Hamilton. (A. N. S. P.)

Diatrypa sibilans Saussure.

One female; Bayamon, Porto Rico. January, 1899. (U. S. N. M.)

There is some little doubt in the determination of this specimen, as the apex of the ovipositor is acute, while Saussure describes it as obtuse.

List of the Species of Orthoptera known from Porto Rico.

The names of the species previously noted have been collected from Scudder's Index (Occasional Papers, Boston Soc. Nat. Hist., vi, 1901), and only forms that have positively recorded from the Island and dependencies have been included. The species included in the Index are preceded by an asterisk.

Family FORFICULIDÆ.

* Labidura riparia (Pallas).
* Psalis gagathina (Burmeister).
Anisolabis annulipes (H. Lucas).
Anisolabis maritima (Gené).
Anisolabis azteca (H. Dohrn).
* Apterygida bimaculata (Palisot).
Apterygida gravidula (Gerst.).
Apterygida buscki Rehn.

Family BLATTIDÆ.

* Anaplecta dorsalis Burmeister.
Phyllodromia bivittata Serville.
* Phyllodromia delicatula Guérin.
Phyllodromia punctulata (Palisot).
*Phyllodromia supellectilium (Serville).
*Ischnoptera blattoides (Saussure).
* Ischnoptera rufa Brunner.
Plectoptera porcellana (Saussure).
Plectoptera poeyi (Saussure).
Pycnoscelus surinamensis (Linnæus).
Panchlora peruana Saussure.
Panchlora virescens (Thunberg).
Panchlora exoleta Burmeister.
Blaberus rufescens Saussure.
* Hemiblabera manca Saussure.
*Hemiblabera brunneri (Saussure).

Family MANTIDÆ.

Callimantis antillarum (Saussure).

Family PHASMIDÆ.

Lamponius portoricensis Rehn.
Bacunculus dryas (Westwood).
* Clonistria linearis (Drury).
* Phibalosoma (Xylodus) adumbratum (Saussure).
* Bacteria calamus (Fabricius).
* Bacteria (Pseudobacteria) yersiniana Saussure.
*Diapherodes angulata (Fabricius).
* Aplopus micropterus (Lepel. and Serv.).
* Acanthoderus cornutus (Burmeister).

Family ACRIDIDÆ.

Paratettix frey-gessneri Bolivar.
Orphulella punctata (De Geer).
Plectrotettix gregarius (Saussure).
Sphingonotus haitensis (Saussure).
Schistocerca americana (Drury).
Schistocerca ægyptia (Thunberg).

Family TETTIGONIDÆ.

Microcentrum triangulatum Brunner.
Conocephalus guttatus Serville.
Conocephalus macropterus Redtenbacher.
* Xiphidion fasciatum (De Geer).
* Xiphidion fuscum (Fabricius). †
*Polyancistrus serrulatus (Palisot).

Family GRYLLIDÆ.

* Gryllotalpa hexadactyla Perty.
* Scapteriscus didactylus (Latreille).
Ellipes minuta (Scudder).
Gryllus assimilis Fabricius.
* Gryllodes muticus (De Geer)
Gryllodes poeyi (Saussure).
Amphiacusta caraibea Saussure.
Anaxipha pulicaria (Burmeister).
Cyrtoxipha imitator Saussure.
* Diatrypa sibilans Saussure.
* Orocharis vaginalis Saussure.
* Orocharis terebrans Saussure.
* Orochiris krugii Saussure.

† This is a European species and its occurrence here is very questionable.

A REVISION of the NEARCTIC CHRYSOPIDÆ.

BY NATHAN BANKS.

Every entomologist knows *Chrysopa;* for there are few regions in the world where insects abound unrepresented by *Chrysopa*, or some allied genus. Throughout our country *Chrysopa* is represented in every locality by several species; and everywhere there is at least one species which may be reckoned among the "common insects." The delicate green color, the beautiful golden eyes, and, above all, the peculiar odor of certain species have made *Chrysopa* familiar to every collector of insects.

The family Chrysopidæ is distinguishable from the other families of Neuroptera by the following characters:

Mouth not rostrated, no anal space to the hind wings; anterior legs simple (not raptatorial); wings bare (not powdered); antennæ setiform; costal space of anterior wing is narrow at base, no recurrent vein, transverse veinlets in gradate series. The family is closely related both in structure and in larval habits with the Hemerobiidæ, but a colorational character will always separate them; the Chrysopidæ are usually mostly green, while the Hemerobiidæ are never green, but more or less brown. There are various structural characters which separate the two families. The pronotum in Chrysopidæ is usually as long or longer than broad, in the Hemerobiidæ it is plainly broader than long. The wings of the Chrysopidæ have many more cross-veins than in the Hemerobiidæ; the result is that most of the cells in a Chrysopid wing are rarely more than twice as long as broad, while in the Hemerobiid wing the cells are three times and usually four to six times as long as broad. In the Chrysopidæ there is but one radial sector which is connected back to radius by at least six cross-veins. In the Hemerobiidæ there are usually several radial sectors, and the last is connected back to the radius by only one to three cross-veins. In the Chrysopidæ the radial sector of the hind wing is united for some distance to the median vein; this does not obtain in the Hemerobiidæ.

The Chrysopidæ are insects of rather small size with comparatively large wings. At rest, the wings are held roof like over the body, and the antennæ are extended outward and forward. Their flight

is never rapid, and usually slow and somewhat irregular. They fly little during day time, and not far even when disturbed. At twilight and in the early evening their flight is more extended, and they are then at their best. Several species are attracted to lights. The females appear to generally deposit their eggs in the afternoon or evening. Pairing, as far as I have observed, takes place in the day-time; the sexes are attached end to end. There are no secondary sexual characters, save in the genus *Meleoma*, where the male has a protuberance between the bases of the antennæ.

The odor, so characteristic of some of the commoner species of *Chrysopa*, is not (as has been noticed by several writers) found in all of the species. *C. 4-punctata* is the most common of the inodorous species, *C. oculata* the most common of the odorous ones. The cib arian structures are quite well developed; the mandibles are short and stout; the maxillæ large, and with five jointed palpi; the labial palpi three-jointed. Yet, so far as I am aware, the adult insect takes no nourishment. However, they probably live for a week or more. When they die, their frail bodies must soon disappear, as I have never found a dead specimen.

The genital organs in nearly all of our species are withdrawn in the last segments of the abdomen; they are rather soft and probably shrink in drying. They have been used in the separation of some European forms, but in the few closely allied forms that I have examined, they are not useful. The tarsi terminate in two claws, similar in character in all of our species.

Chrysopa has long been familiar to entomologists on account of its remarkable larval habits. They pass the winter usually as pupæ, but at least one species, *Chrysopa plorabunda*, hibernates in the adult state. Flies of this species have been found in hedges and heaps of dry leaves during January, February and March. The hibernating pupæ hatch, according to the species, from March to June. The flies mate as soon as possible, and then the females proceed to attach their curious eggs in favorable situations. The egg is elliptical in shape and attached at one end to a long slender pedicel, whose base is expanded and attached to the leaf or twig. Usually there is but one egg to each stalk; but I have found in July a single stalk on the bark of oak trees, which bore at its summit a cluster of ten or fifteen eggs. I did not succeed in rearing the larvæ. At least one European species has a similar habit. In some species the

eggs are laid in groups of from eight to thirty (*C. oculata*), in others the eggs occur singly (*C. rufilabris*). In the latter class the pedicel is often shorter than in the former group. In many cases the eggs are laid in proximity to colonies of plant-lice, upon which the larvæ are destined to feed. Sometimes, however, the larvæ are obliged to search for food.

At the top of each egg is a micropyle—a cup shaped piece projecting above the surface, with a minute central pore. The top of the egg is irregularly reticulate; the base is more pointed than the top. The egg in a day or so becomes darker, and cracks across the top and partly down one side. Through this slit the larva crawls out. t is very bristly, has a big head, and a tapering body. The jaws are very large, the antennæ long and curved, and the palpi broad and project out in front. The legs are slender, and each tipped with two claws and a longer median sucker. The larva of each species is characteristic, though larvæ of closely allied forms differ but little.

The larva crawls down the pedicel to the leaf, and soon moults. Fitch has recorded that in some species the first food of the larva was eggs of other insects, after which the larva attacked plant lice. In other species, however, the larvæ do attack plant-lice for their first meal, and are not as timid as Dr. Fitch records of the larva he observed. As the larva grows in size it becomes more fusiform in shape, and in many species each segment develops a lateral protuberance bearing a bunch of bristles. The color becomes darker and often spotted; the larvæ of the few species known to me being marked in a different manner. The question of the larval moults is one of peculiar interest. The new-born larva soon moults as is readily observable; but from this time till it moults within the cocoon most authors have observed no moulting. Fitch and Schneider record that they have not seen a moult, and I have watched in vain. Vine describes one moult about midway in larval life.

The larvæ of some species cover themselves with a pile of debris, made up of the skins of their victims. This scalp-carrying habit is also found in the larvæ of some Hemerobiids. It is a protection; but some species that do not have it are extremely numerous and appear moderately free from parasites. In travelling about on the leaf or bark the larva walks in a restless, interrupted way, turning

the head from side to side, and keeping the palpi in motion. The tail is often used to hold on to some spot, but when not in use is often carried turned to one side.

These voracious little larvæ are known as "aphis-lions;" their principal food being aphids. However, they will feed on almost any soft insect, and even upon each other. It seizes the aphid with a quick movement of the jaws and rapidly sucks the unfortunate victim dry, often turning it around in order to extract all the juices. In this manner they destroy a great number of plant-lice in a day. The innumerable hosts of aphids with their remarkable fecundity are no match for the ravenous appetite of these *Chrysopa* larvæ, and in a few days plants badly infested with "green fly" are clean again. Their useful habits have been commented upon by almost every economic entomologist; not only in the destruction of plant lice, but as attacking the pear-tree *Psylla*, scale insects, the chinch-bug, elm-leaf beetle and other pests.

The length of the larval life is from one to three weeks. When a proper size is reached the larva rests for a time and then proceeds to spin the cocoon. This may be placed almost anywhere, sometimes in a crevice of the bark or a fold in the leaf, but quite as often they are fully exposed to view. The larva, which is now fusiform in shape, spins around itself threads which are drawn tighter and tighter till the larva is curled upon itself as closely as is possible. The spinning continues and results in a practically spherical cocoon, white or yellow in color. Some cocoons are more elliptical than others.

The silk glands open near the end of the abdomen, and they emit a single smooth thread.

After a period of about ten days the pupa cuts off a circular lid from the cocoon and crawls almost or completely out. The mandibles of the pupa are short, stout and sharp-pointed, enabling the creature to cut through its tough cocoon. In a few minutes its back bursts along the median line and from it gradually, issues the adult fly; at first pale and weak, but in the course of an hour or so assumes its full coloration and development.

Shimer has noted that in a larva that had but four legs, the adult fly from it had all six legs fully developed. Since the Chrysopid larva lives exposed it is not strange that they are attacked by various parasites. The Chalcidids, *Perilampus hyalinus*, *Chrysopopha-*

gus compressicornis, *Syntomosphyrum orgyiæ*, *Aphycus chrysopæ*, and all the species of *Isodromus* issue from the cocoon. Two Ichneumons, *Otacustes chrysopæ* and *O. atriceps* have also been bred from cocoons. A Proctotrypid, *Telenomus chrysopæ*, has been bred from the eggs.

Historical.

Several of our early entomologists recognized that we had more than one species of *Chrysopa*, but failed to distinguish them from the European species. Thomas Say, the first in this, as in many groups, described *Chrysopa oculata* in 1839. About the same time Burmeister issued his "Handbuch" in which five species are described from our country, one of which is considered identical with Say's species. Nothing was published for a number of years, until in quick succession appeared the works of Schneider (1851), Walker (1853), and Fitch (1855). Schneider's work is a monograph of the species of the world. He recognized all of Burmeister's species and added two new ones. Walker's "Catalogue" contained three new species from the United States. Fitch did not recognize any of the previously described species, but described all the forms known to him (twenty-three in number) as new. Probably he was unaware of Schneider's and Walker's works. About twelve of his species fall as synonyms.

Hagen in his "Synopsis of the Neuroptera of North America" (1861) added four species. Shimer in 1862 described one species, since shown to be identical with one of Fitch's. In 1869 McLachlan described a handsome species from Texas.

In 1890 Mr. Coquillett, in the Report of the State Board of Horticulture of California, described a new species—*C. californica*. In 1892 the present writer described a *Nothochrysa*, and since then has added nine other species. In 1894 Mr. Mac Gillivray described two species of *Nothochrysa;* and in 1901 Mr. McClendon described a new species from Texas. Thus up to date we have fifty-five names for the Chrysopidæ of the United States, proposed by twelve persons.

Classification.

For a long time the genus *Chrysopa* covered all the forms. Gradually it has been split up, and in this paper our species are distributed in six genera. Two of these are new. Most of the

genera are very well separated, but *Leucochrysa* is very close to the *nigricornis* section of *Chrysopa*. These six genera may be separated by the following table:

1. Third cubital cell divided longitudinally into two sub-equal parts..... 2.
   Third cubital cell divided obliquely into two very unequal parts..... 3.
2. Veinlets on outer and posterior margins of wings forked; color green. **Allochrysa.**
   Veinlets on outer and posterior margins of wings mostly simple; color dark. **Nothochrysa.**
3. Gradate series in fore wings of but three or four veinlets; in hind wings but one series of gradate veinlets.....**Eremochrysa.**
   Gradate series of fore wings of more than four veinlets, rarely with but one series in hind wings..... 4.
4. Basal joints of antennæ widely separated and rather slender; in male with a horn between them.....**Meleoma.**
   Basal joints of antennæ quite close together; no horn in male..... 5.
5. Antennæ much longer than wings; pterostigma with a brown dot. **Leucochrysa.**
   Antennæ shorter, or but little longer than wings; pterostigma without brown dot.....**Chrysopa.**

NOTHOCHRYSA McLach.

Similar to *Chrysopa;* the third cubital cell divided subequally as in *Allochrysa*, but differing from both of these genera in having the veinlets on the posterior and outer margins of wings not forked. The third cubital cell has but one branch to the hind margin, while in all our other genera there are normally two. The uniform dark venation and the generally dark color also distinguish this genus from all our other species. Type *N. fulviceps.*

Nothochrysa californica Banks.—Head yellowish; antennal bases surrounded with black which extends upward on vertex in three lines, one each side near the eye, and one median, enlarged at tip on top of vertex. Antennæ wholly black. Pronotum dark brown, with a paler median stripe, and the sides narrowly yellow. Rest of thorax and the abdomen dark brown, the latter marked with yellow near the tip. Legs brownish, the tibiæ rather pale. Wings with wholly brown venation; pterostigma brown and very distinct; quite close to tip of wing. Antennæ rather short. Pronotum longer than broad, tapering in front. Abdomen quite large, especially at the tip. Wings broad, both pairs rounded at tips; only very few of the veinlets on outer and posterior margins of wings forked, and these only slightly. Length 14 mm.

The type is from Southern California. There is a specimen in the National Museum from the same State. It is one of the most remarkable and striking forms in the family as represented in this country.

ALLOCHRYSA gen. nov.

Similar to *Chrysopa*, but the third cubital cell is nearly equally divided, the divisory veinlet running into the end-veinlet of the cell instead of into the upper margin. The antennæ are quite long, their bases close together. There are two full series of gradate veinlets in each wing. Type *A. virginica*.

The two species known to me are separated as follows:

Pterostigma marked with brown; large species; basal part of antennæ pale. **virginica.**

Pterostigma unmarked; small species; basal part of antennæ black.. **parvula.**

Allochrysa virginica Fitch.—Green, unspotted; but in life the abdomen is marked with reddish and yellow. Antennæ as long as wings. Pronotum as long as broad, tapering in front. Legs very slender. Wings large and long, fore pair rounded, hind pair acute at tips; third cubital cell divided obliquely; both series of gradate veinlets are very full. Venation green, except the outer gradate series which is brown, and sometimes the radial cross-veinlets are dark at bases; pterostigma in both pairs with a brown spot at base, and in fore wings there is a brown dot on the last veinlet connecting the cubital and median veins. Length 19 mm.

The type came from Cartersville, Virginia. I have taken specimens in the District of Columbia from oak trees in July, and have co-types of *N. phantasma* MacGillivray from W. Chop, Mass., in August; also from Florida. Have also seen a specimen from Staten Island, N. Y., in August. This species appears to favor the oak tree, and lives among the upper branches where its capture is most difficult.

Allochrysa annulata MacGillivray.

I have not seen this species. In coloring of head and wings it agrees exactly with *Chrysopa oculata*, and I suspect it is a sport of that species. It was described from Massachusetts.

Allochrysa parvula n. sp.—Face pale yellowish, vertex greenish, devoid of markings; basal joint of antennæ pale yellowish, outside with a black line, second joint and about a dozen following black, beyond pale; prothorax green, margined on the sides with red-brown most broadly in front; rest of thorax and the abdomen pale greenish, unmarked; wings hyaline, veins green, most of the transversals brown, pterostigma not distinct. Head rather broad, vertex with a slight depression in the middle; antennæ about as long as wings; pronotum short and broad, plainly narrowed near front; wings moderately long and acute at tips, third cubital cell divided into two sub-equal parts by the divisory veinlet, radial sector connected to the median by four cross-veins, beyond which there are five branches of the sector. Length 11 mm.

One specimen from Runnymede, Florida. Bred from a white cocoon enclosed in a mass of rubbish. It is the smallest of our species of this genus, and differs from the others in that the median vein runs straight to the hind margin and not into the second series of gradate veinlets.

LEUCOCHRYSA McLach.

General characters of *Chrysopa*, but antennæ very much longer than the wings. Pterostigma very distinct, brownish. The third cubital cell is divided obliquely, but the divisory veinlet is nearly straight, and starts close to the cubitus. The first connecting veinlet from the radial sector back to the median extends basally before the origin of radial sector (not so in *Chrysopa*). The genus, with us, occurs only in the Southern States, and is more fully represented in tropical countries. Type *C. varia*.

Our two species may be distinguished as follows:

Basal joints of antennæ reddish above; anterior wings quite broad; gradate series nearly parallel, the inner of 7-8 veinlets; large species...**floridana.**

Basal joints of antennæ not reddish above, anterior wings rather narrow; gradate series converging behind, the inner of 5 veinlets; smaller species. **americana.**

Leucochrysa floridana Banks.—Pale green; basal joints of antennæ reddish above; a narrow transverse red line, angulate at middle, on the front of vertex reaching from eye to eye. Pronotum narrowly reddish on margin. Wings with green veins, most of the cross-veinlets in fore wings black; pterostigma long, brownish, very distinct in both pairs. Antennæ longer than the wings, vertex somewhat elevated, but flat on top; pronotum longer than broad, much narrowed in front. Anterior wings broad, rounded at tips; hind wings rather narrow, acute at tips; gradate series nearly parallel, seven to eight veinlets in inner series. Length 17 mm.

Specimens come from Lake Worth and Biscayne Bay, Florida, and from Ocean Springs and Utica (August), Mississippi. It may be the *Chrysopa citri* Ashmead, but his description may apply to the next species, or to some species as yet unknown to me.

Leucochrysa americana Banks.—Pale green; vertex with a narrow transverse red line, angulate in middle, reaching from eye to eye; pronotum with a red mark on anterior sides. Wings with green venation, a few of the cross-veinlets wholly or in part black; pterostigma brownish, very distinct in all pairs. Antennæ much longer than the wings; vertex with two pits above; pronotum longer than broad, much narrowed in front. Wings rather narrow, the fore pair nearly acute at tips, the hind pair plainly so. The gradate series converge behind, the inner series of five veinlets. Length 15 mm.

One specimen, the type, from Auburn, Ala.

CHRYSOPA Leach.

The third cubital cell is unequally divided, the veinlet running into the upper border of the cell. There are two series of gradate veinlets in the wings, but sometimes one series is very short, especially in the hind wings. The antennæ are rarely as long as the wings. Type *C. perla.*

There are in our fauna five distinct groups, one represented by but one species. The *nigricornis* section is very distinct by many characters from the other forms. The species known to me are tabulated below:

1. Some of the longitudinal veins of wing black for some distance from their bases ..... **schwarzi.**
   Longitudinal veins not black ..... 2.
2. Antennæ with basal portion (except joint 1) black ..... 5.
   Antennæ not black ..... 3.
3. Second joint of antennæ with a red ring ..... 10.
   Second joint not red ..... 4.
4. Venation all green ..... 15.
   Some of the cross-veinlets black in part ..... 18.
5. Pronotum margined with red ..... 6.
   Pronotum not margined with red ..... 7.
6. Antennal sockets margined with red, basal joint of antenna without dark line ..... **coloradensis.**
   Antennal sockets without red, basal joint of antenna reddish or with a dark stripe ..... **lateralis.**
7. Basal joint of antenna with a black line ..... 8.
   Basal joint without line ..... 9.
8. At least two spots on vertex of head ..... **sabulosa.**
   No spots on vertex ..... **lineaticornis.**
9. A black dot each side on clypeus, radial cross-veins only partly black, pterostigma indistinct; size large ..... **nigricornis.**
   No black dot on clypeus, radial cross-veins wholly dark, pterostigma brownish in all wings; size smaller ..... **columbiana.**
10. Gradate veinlets green; wings broad ..... **chlorophana.**
    Gradate veinlets more or less black ..... 11.
11. Two black spots on clypeus, pronotum with large black spots ..... 12.
    No black spots on clypeus ..... 13.
12. Inter-antennal spot forming an X ..... **chi.**
    Inter-antennal spot forming a Y ..... **ypsilon.**
13. Divisory veinlet of third cubital cell almost wholly black; veinlets connecting median and cubitus are wholly black; but four veinlets connecting radial sector to median ..... **assimilis.**
    Divisory veinlet black only at end; veinlets connecting median and cubitus green in middle; usually five veinlets connecting radial sector to median ..... 14.

14. Costal veinlets almost wholly black; vein at end of third cubital cell mostly black, smaller species ..... **albicornis.**
Costal veinlets less black; vein at end of third cubital cell mostly green, larger species ..... **oculata.**
15. Cheeks suffused with red, wings acute at tip ..... 16.
Cheeks not suffused, a narrow brown line; anterior wings hardly acute at tips ..... **plorabunda.**
16. Divisory veinlet of third cubital cell ends before middle of that cell and before the cross-veinlet; southwestern species ..... **externa.**
Divisory veinlet usually ends at or beyond the cross-veinlet ..... 17.
17. Eastern specimens; anterior wings very slender and acute at tips. **harrisi.**
Western specimens; anterior wings less slender and not so acute. **californica.**
18. Basal joint of antenna with a reddish line above; pronotum margined each side with red, cross-veins nearly all black ..... **bimaculata.**
Basal joint of antennæ without line; pronotum not margined with red.. 19.
19. A red angular transverse line from eye to eye just above antennæ. **arizonensis.**
No such line ..... 20.
20. Pronotum and abdomen with a median red stripe, no side marks. **medialis.**
No such median stripe ..... 21.
21. Pronotum with two or three red spots each side, thorax and abdomen also spotted on sides, and often a red dot on head near eye. **quadripunctata.**
Pronotum not spotted with red ..... 22.
22. Radial and costal cross-veins black in middle, green at bases, a large species. **erythrocephala.**
Radial and costal cross-veins black at ends, green in middle ..... 23.
23. Size large; wings broad; cubital cross-veins and branches of radial sector not black at bases; a red spot under each eye ..... **emunctа.**
Size smaller; wings narrow; nearly all cross-veins black at bases ..... 24.
24. Color straw yellow; wings long and narrow, red stripe on cheek; no pale median dorsal stripe ..... **interrupta.**
Color green ..... 25.
25. Black stripe from eye to mouth; costal cross-veins of fore wings wholly black, wings rather broad ..... **cockerelli.**
Red stripe under each eye, costal cross-veins only partly black; a pale median dorsal stripe in life ..... **rufilabris.**

Chrysopa schwarzi n. sp.—Face yellowish, with a black mark on each cheek, a transverse black mark surrounding the bases of the antennæ; vertex each side red, middle clear yellow. Antennæ pale yellowish, unmarked; palpi marked with black. Pronotum red each side, yellow in middle; meso- and metathorax yellow in middle, red on sides, the latter extending down on pleura. Legs and abdomen green. Wings with green venation, the pterostigma long and distinct; in fore wings the subcostal vein is black for about one-fourth its length, and the cross-veins adjoining are more or less black; the anal vein and branches are black for some distance. Of usual shape; wings rather narrow, plainly acute

at tips; the divisory veinlet of the third cubital cell ends plainly beyond the cross-vein. Length 16 mm.

One specimen from Las Vegas, Hot Springs, New Mexico, Aug. 5th (Barber and Schwarz). The type is in the National Museum collection, also from Prescott, Arizona (Oslar). The black on the subcostal and anal veins is not found in any other of our species of *Chrysopa*.

Chrysopa oculata Say.- Face pale yellowish; a reddish spot on each side, a black crescent under each eye (often connected to the band), a broad blackish band under antennal sockets, emarginate in the middle, sockets above are margined by a narrow blackish line, between antennæ is a reddish spot extending upward in shape of a Y; vertex with 2 submedian dots (sometimes connected to the Y), and a spot each side near eye (sometimes absent). Palpi broadly banded with red-brown; second joint of antennæ blackish, the first joint sometimes marked with red above. Pronotum greenish, with several black spots each side, more or less distinct; rest of thorax and legs pale greenish, often a dot at tip of each lateral lobe of the metanotum. Abdomen greenish. Wings hyaline, veins green, many of the cross-veinlets marked with black; at least the gradate veinlets and the costals of hind wings usually wholly black; pterostigma often distinct. Length 15-17 mm.

Very common throughout the Eastern United States and Canada. Variable in size and breadth of wings. Some specimens with broad wings and broadly rounded tips have more black on veinlets, and may be a variety or even distinct species, but I cannot find any distinctive characters. These specimens appear to be most common in early summer. The forms described by Fitch as *illepida*, *fulvibucca* and *mississippiensis* appear to me to be only forms of this variable species. The life history has been described by Marlatt. His figure of the larva shows its characteristic markings. The eggs are laid in clusters. Adults are seen from early in July to September, being most common in July. They are chiefly found in tall grass and shrubbery, but sometimes on trees.

Chrysopa chlorophana Burm.—This species has the head marked on the same general plan as *Ch. oculata*, but the mark under each eye is usually short, and the submedian dots on vertex are often indistinct or absent; the palpi less broadly banded with brown. The basal joint of antenna sometimes has a transverse red line above, the second joint is blackish. The thorax and abdomen are dark green, the pronotum with a few dark marks each side. The wings are hyaline, the veins are green, sometimes some of the veinlets, especially the costal series of the hind wing, are marked at their ends with black; but the gradate series are always green. The pterostigma is commonly very distinct. Length 16-17 mm.

I have specimens from Hyattsville, Md.; Sherbrooke, Canada; Agric. College, Mich.; Bright Angel, Colorado Canon, Arizona, July 12th; and Las Vegas, Hot Springs, New Mexico, August 11th; Ft. Collins, Colo.; Ashland, Oreg.; Sandusky, Ohio. It has also been recorded from Axton, New York; Penna., Nova Scotia, Newfoundland and Canada. According to this distribution it would seem to be a northern form. It is distinguished from *Ch. oculata* by the green gradate and other veinlets. Fitch's *Ch. xanthocephala* and *Ch. bipunctata* belong to this species, and also, I believe, *Ch. transmarina* Hag., and *Ch. latipennis* Schn. All the specimens I have seen were taken in July and August.

Chrysopa ypsilon Fitch.—This species is extremely similar to *Chrysopa chi*, and can best be described in comparison. The head is marked as is that species, except that the median black mark forms a Y instead of an X; the black below antennal sockets is not connected above between antennæ. The Y is sometimes connected to the submedian pair of black dots on the vertex. The thorax is marked as in *Ch. chi*, as are also the wings, but the cross-veins are more heavily marked with black than in that species. The wings have the same form. Length 14-15 mm.

I have specimens from Ithaca, Axton, Adiron. Mts. (June) and Sea Cliff, N. Y.; the latter were taken in May. I have also seen specimens from New Jersey and Sherbrooke, Canada. It is very close to *Ch. chi*, but the difference in head-markings appears to be constant. Hagen records a specimen from Washington, D. C., but I have not met with it here.

Chrysopa chi Fitch.—Head green; a black spot under each eye, not connected to eye, a similar black spot each side on clypeus, lower margin of antennal sockets black, but not the outer margin, the black continued upward between antennæ and divided in a Y, often connected to the submedian dots of vertex, the entire mark forming an X, a black dot on vertex each side near eye; all the marks are shining black. Second joint of antennæ black; last joints of palpi black; pronotum green, with three black spots each side; rest of thorax, the abdomen, and legs green, each anterior lobe of the mesothorax has two black dots. Wings hyaline, veins green, gradate veinlets and some cross-veinlets near base black, many of the other cross-veinlets black at one or both ends, pterostigma not very distinct; hind wings with the costal veinlets wholly black. Wings rather broad, broadly rounded at tips. Length 14 mm.

Described by Fitch from New York.

I have specimens from Franconia, New Hampshire (Mrs. Slosson), and Axton, Adiron. Mts., N. Y., June. Several of the specimens have clinging to the wings one to three specimens of a little Cecido-

myiid fly; the fly doubtless uses the *Chrysopa* as a means of transportation.

Chrysopa albicornis Fitch.—Head yellowish, a red spot on each side of the clypeus, a blackish curved mark under each eye, a broad blackish band under antennal sockets extending upward between bases of antennæ and then bifid, sometimes connected to the two submedian dots on vertex; upper margin of antennal sockets narrowly margined with red-brown, and a red-brown dot each side behind eye. Palpi banded with red-brown; second joint of antennæ blackish, basal joint sometimes with a red transverse mark above. Prothorax green, each side with a few dark dots; rest of thorax, legs and abdomen green. Wings hyaline, veins green or yellowish, costal cross-veins almost wholly blackish, many other cross-veins broadly black on bases or tips, gradate series black; in hind wings the costal cross-veins only are black. Length 11-12 mm.

Specimens are from Holly Springs, Miss.; Marion, Ala. (July 2nd); Falls Church, Va.; Burlington Co., N. J., and Sea Cliff and Ithaca, N. Y. All taken in July and August. Very close to *Ch. oculata*, but on the average smaller, and the cross-veins of wings more marked with black.

Chrysopa assimilis Banks.—Face yellowish; a red-brown mark under each eye, a broad transverse band under antennal sockets and extending upward between them, above are two reddish dots, and two more on vertex, behind each eye is another red dot. Palpi banded with red-brown. Second joint of antennæ black. Pronotum greenish, with some dark spots on each side; rest of thorax, legs and abdomen greenish. Wings hyaline, veins green, gradate and cross-veinlets marked with black; the veinlets connecting the median and cubital are wholly black, as well as the divisory veinlet of the third cubital cell. Pterostigma moderately distinct. In the hind wings the costal cross-veinlets are wholly black. The fore-wings are broadly rounded at tip, the hind wings are acute at tip; but four veinlets connecting the radial sector to median before the gradate series. Length 14 mm.

Two specimens, the types, from Ashland, Oregon, Sept., 1897. Similar in markings of head to *Ch. oculata*, but differing in coloring of veinlets of wings.

Chrysopa nigricornis Burm.—Head pale green, a black spot each side at base of clypeus, sometimes another black dot each side above this and below the eye. Basal joints of antennæ pale green, beyond black for about 15 joints (1-5 of length); rest of body green; wings with green veins, gradate series and the costal cross-veinlets black, many other cross-veinlets black at one end; pterostigma quite distinct. Vertex of head elevated in a triangular area, which is depressed in the middle and the hind border an elevated ridge. Pronotum rather short, plainly narrowed in front, transverse furrow very deep. Wings moderately long, acute at tips. The inner series of gradate veinlets is often incomplete toward tip, and in the hind wings is sometimes wanting. The divisory veinlet of third cubital cell ends much beyond the cross-veinlet. Length 15-20 mm.

Specimens have been seen from Buffalo, Ithaca, Staten Island and Sea Cliff, N. Y.; Washington, D. C.; Falls Church, Va.; Columbus, Ohio; Onaga, Kans.; Ft. Collins, Colo., and Sherbrooke, Can.; also from Mass. and R. I. They appear from June till September, but apparently most common in June. Specimens vary in markings of veins; sometimes many cross-veins are black only in middle. It has been taken at electric lights.

Chrysopa lateralis Guérin.—Face pale yellowish, faint trace of red spot each side near clypeus, vertex green, bordered in front just above antennæ with reddish, basal joint of antennæ marked with reddish on outer and upper side, beyond for about one-fourth length black. Pronotum green, with a red stripe on each side, rest of thorax and abdomen green; legs paler. Wings with green venation, the gradate series, costals for about one-half the distance, and most of radial cross-veinlets black; many other cross-veinlets partly black; pterostigma not prominent. Antennæ reaching to tip of wings; pronotum much narrowed in front, transverse groove very distinct. Wings long and narrow, acute at tips; the inner gradate series more or less incomplete. Length 15 mm.

It was described from Mexico. Hagen described *Ch. pavida* from Mexico and South Carolina. I have seen specimens from South Carolina and from Runnymede and Key West, Florida. The latter was bred from a white cocoon covered with bits of bark and debris. A specimen from Jalapa, Mexico, appears to be the same species, but the red mark on the basal antennal joint is very dark, and the cross-veinlets are more black.

Chrysopa columbiana n. sp.—Head pale yellowish, without markings, thorax and abdomen pale green, second joint of antennæ and beyond for about one-fourth length black. Wings with green venation, gradate series and radial cross-veinlets black, many other cross-veinlets black in part, very few black veinlets in hind wings; pterostigma very distinct in both wings, pale brown in color. Pronotum broad, very little narrowed in front, transverse groove not distinct. Wings quite narrow, acute at tips. Length 13 mm.

One specimen from Washington, D. C. Related to *Ch. nigricornis*, but the unmarked face and the black radial cross veinlets lead me to consider it distinct.

Chrysopa lineaticornis Fitch.—Face almost white; vertex pale green; palpi white; basal joints of antennæ whitish, with a prominent black stripe on outer upper side, basal third of antennæ beyond black. Prothorax pale green, sometimes with a little reddish on outer edge; no yellowish stripe in middle; rest of thorax and the abdomen dull green, the latter more yellowish near tip; legs whitish; wings whitish green, green venation, gradate veinlets, costals, and often the radial cross-veinlets black; many other cross-veinlets more or less black; pterostigma quite distinct. Hind wings with costals brown, the pterostigma also

distinct. Antennæ reach almost to tip of wings, the basal joints rather larger than usual; prothorax plainly narrowed in front, the transverse furrow is not very distinct. Wings quite narrow, acute at tips. Length 13-15 mm.

It was described from Central New York. I have seen specimens from Franconia, New Hampshire; Agricultural College, Michigan, July 12th; Bay Ridge, Maryland, July; Washington, D. C., July 16th, on pine; and Brookline, Mass. This may be the same as *Ch. ampla* Walk., from Georgia, but I am not certain.

Chrysopa coloradensis Banks.—Face pale green, a red-brown crescent under each antennæ, a red-brown stripe under each eye (not reaching to mouth), and vertex with a reddish mark each side adjoining the eye; palpi marked with red; basal joint of antennæ pale, second and beyond for about one-fourth the length, black. Prothorax green, with a red stripe on each side; anterior lobes of mesothorax reddish; legs pale; abdomen darker green. Wings with green venation; gradate series, the costals and the radials entirely, and the other cross-veinlets partly black; pterostigma rather distinct. Antennæ not very long; pronotum broader than long, narrowed in front; wings moderately long, scarcely acute at tip, except in the hind pair; divisory veinlet of third cubital cell ending much beyond cross-vein. Length 14-17 mm.

I have seen specimens from Denver, Colo.; Mesilla and Santa Fé, New Mexico, July; Williams, Arizona, July; Hood River, Oregon, Sept.; Gazelle, Calif., Sept., and Pullman, Washington. It is a very handsome species and not very closely related to any other form.

Chrysopa sabulosa Banks.—Face yellowish, a triangular black spot under each eye, a black spot under each antenna (but separated therefrom), and a black dot above each antenna. Basal joint of antenna broadly marked with black in front and on outer side, second joint black and the following ones also to about one-fourth the length of antenna. Palpi marked with black. Thorax, abdomen and legs green, unmarked. Wings with green venation, pterostigma rather distinct. The antennæ are rather short; the pronotum about twice as broad as long; abdomen short; wings rounded at tips, usually but one series (the outer) of gradate veins, sometimes there are traces of the inner series. There are not as many hairs on the veins as in most species. The divisory veinlet of the third cubital cell ends beyond the cross-vein. The male genitalia is quite elaborate, the lower part ends in three tufts of black bristles. Length 12-14 mm.

The type is from Colorado, and I have another specimen from Southwestern Colorado, July 12th (Oslar). There is a male in the National Museum collection from Las Cruces, N. Mex. (Cockerell). It is a very peculiar species on account of the almost complete absence of the inner series of gradate veinlets in both wings.

Chrysopa explorata Hagen.—"Yellowish; face with a large, quadrangular spot, occiput with a Y-shaped streak and spot, red; antennæ yellowish; fus-

cous at base; the first article yellow, with the apex above, red; prothorax broad, obliquely truncated in front; anterior margin black; wings hyaline, narrow, pterostigma yellow, interiorly with a red spot; transverse veins of the anterior wings almost all blackish-fuscous; gradate veins 5 and 5. Length to tip of wings 13 mill." (Hagen.)

I have not seen this species, and copy Hagen's description above. It was described from Mexico, but Hagen, in Wheeler's Report, 100 meridian, records a specimen from Arizona. I have not included it in the table; it belongs to the *Ch. nigricornis* group, and appears to be very distinct from any of our other species.

Chrysopa rufilabris Burm.—Face yellowish or greenish, a red stripe under each eye to mouth; antennæ pale yellow; thorax and abdomen green, with a pale yellow median stripe; legs yellowish. Wings with green veins; the gradate veins black, and also the ends of some other cross-veins. In some specimens nearly all of the cross-veins are more or less black. There is considerable variation in the shape of the wings, some specimens (chiefly from the North) have broader wings, and tips rounded; while southern specimens have narrow wings with acute tips. The divisory veinlet of the third cubital cell usually ends just beyond the cross-veinlet; in specimens from the extreme South (Louisiana and Florida) it ends directly in the cross-veinlet. This form may be the *C. attenuata* of Walker. Specimens occur, however, with the divisory veinlet ending before the cross-veinlet. Length 12 to 15 mm.

Specimens have been seen from Ithaca and Sea Cliff, New York; Washington, D. C.; Falls Church, Va.; New Brunswick, New Jersey; Medina, Ohio; Agricultural College, Mich.; Shreveport, La.; Kissimmee and Biscayne Bay, Fla. Hagen records it from Georgia. It is thus evidently spread throughout the entire eastern part of the country. It occurs from June till October, on various trees, shrubs and low plants. In life it is grass-green, with a pale yellow stripe from vertex to apex of abdomen. It has a distinct fetid odor. It flies freely at twilight, and has been taken at lights. The life history was described by Fitch. The eggs are laid singly, not in groups. The larvæ are white, with dark stripes on the head. They carry some debris on the body, which often conceals the insects. The cocoon is snow-white.

Chrysopa interrupta Schneider.—Pale straw yellow throughout; a reddish mark from each eye to the mouth. The gradate series wholly, and most of the other cross-veinlets of fore wings brown, in hind wings but few cross-veinlets other than the costals marked with brown; pterostigma not very distinct. Antennæ quite short; pronotum slender, longer than broad, narrowed in front. Wings slender, acute at tips, divisory veinlet of third cubital ends beyond the cross-veinlet. Length 12–13 mm.

Specimens have been before me from New Jersey; Sea Cliff, New York; and Washington, D. C., July; also from Penna.; Selma, Ala., and Aurora, Ill. Several were bred from snow-white cocoons. It is very close to *C. rufilabris*, but in life has no pale median, dorsal stripe. It does not appear to be common anywhere.

Chrysopa quadripunctata Burm.—Pale yellowish, a reddish stripe each side of face from eye to mouth, vertex rather elevated, with two submedian pits, antennæ wholly pale, reaching to pterostigma of wings, prothorax plainly longer than broad, suddenly narrowed at anterior third, beyond with parallel margins, above with one or two transverse ridges and furrows, the anterior sloping side-margins are reddish, and there are four or six reddish spots above, often fading in dried specimens, a red spot on each anterior lobe of the mesothorax, and often some smaller ones between and behind these. Abdomen in life marked with reddish and clear yellow. The wings are moderately broad, the fore pair barely acute at tip, the hind pair plainly so at tip. Venation yellowish, the gradate series black, the central cross-veins blackish at ends, some of the basal cross-veins black, and often the bases of many others black; in hind wings the costals are wholly black. The divisory veinlet of the third cubital cell ends much beyond the cross-veins above. The gradate cells are subequal in length and but little longer than those beyond. Length 14-17 mm.

It was described from Pennsylvania and Carolina; my specimens come from Sea Cliff, N. Y., August; Ft. Lee, New Jersey; Austin, Texas; Falls Church, Va., and Washington, D. C., in June on till October.

This species I have always taken on or near oak trees. It has a scarcely distinct fetid odor. The color is a rather pale green, paler than *C. rufilabris*, and the red spots are very distinct, especially those on the upper side of the first four segments of abdomen.

Chrysopa bimaculata McClendon.—Face pale yellow, unmarked; vertex green; antennæ pale, the basal joint with a narrow red line above; palpi marked with black; prothorax green, a bright red stripe each side, rest of thorax and the abdomen green, unmarked; legs paler Wings with green venation; the gradate series, the costals and the radials wholly black; other cross-veinlets in part black; hind wings with gradate series and radials in part only black; pterostigma quite distinct. Antennæ moderately long, vertex somewhat swollen; pronotum broader than long, narrowed in front. Wings narrow, anterior pair barely pointed, hind pair acute at tips; divisory veinlet of third cubital cell ends beyond the cross-vein. Length 11-13 mm.

Described from Laredo, Texas, August. Mr. McClendon sent me specimens also from Laredo, and I have others from Austin, June, and San Antonio, Texas; and from Biscayne Bay and Palm Beach (Jan. 25), Florida.

Chrysopa emunctа Fitch.—Pale yellowish green, abdomen darker green; a reddish spot under each eye extending toward the mouth; palpi marked with black. Wings with green veins, the gradate series black, and the ends of many other cross-veinlets also black; pterostigma quite distinct. Wings large and broad, the costal area broad, tips rounded in fore wings, in hind pair more acute; the divisory veinlet of the third cubital cell ends much beyond the cross-veinlet; there are eight to ten veinlets in the gradate series. Length 19 mm.

Fitch described this species from Central New York. I have seen but one specimen which fits his description, it is from Franconia, N. H. (Slosson). It is evidently an uncommon northern species, and one of the largest in the genus.

Chrysopa erythrocephala Banks.—Pale yellowish green, abdomen darker green; a black spot each side near base of clypeus. Wings with green veins; gradate veinlets black; the costal and radial cross-veinlets are black in the middle, green at ends; pterostigma not distinct. Antennæ short; pronotum narrowed in front, rather short. Wings quite long and broad, barely acute at tips; gradate series of seven to nine veinlets; the divisory veinlet of third cubital cell ends just beyond the cross-veinlet; costal area not very broad. Length 18–20 mm.

Specimens come from San Bernardino, Calif., July; Mesilla, N. Mex., July 18th; and Pullman, Wash., July 3rd. It is easily distinguished by its large size, and by the costal and radial cross-veinlets being black in the middle, a peculiarity not found in any of our other species.

Chrysopa medialis n. sp.—Face pale yellow, with a red stripe from each eye to mouth, a red dot above and adjoining each eye, sometimes a transverse red mark across vertex; pronotum green, red on anterior margin, and a median red stripe from end to end; middle portions of meso- and metathorax marked with red, sides yellowish green; abdomen pale green, with a median red stripe from base to tip, widened on the posterior margin of each segment; legs pale green. Wings with green venation, considerably marked with black; the gradate series and about all of the other cross-veinlets are black at the ends. Antennæ rather short; wings plainly acute at tips; the divisory veinlet of the third cubital cell ends slightly beyond the cross-vein. Length 15 mm.

A few specimens were beaten from hickory foliage at High Island, near the District of Columbia, in the latter part of September. In life the red markings are very prominent, and the insect at once reminds one of *Ch. quadripunctata*, but the arrangement of the markings is very different.

Chrysopa cockerelli n. sp.—Face yellowish, a black stripe from each eye to the mouth, connecting with each other. Antennæ pale yellow; pronotum and thorax green, the latter with a slight reddish color on each anterior lobe; abdomen and legs green; wings with green veins, the cross-veinlets nearly all black in part; the costal cross-veinlets wholly black. Antennæ short, wings moderately broad, scarcely acute at tips; divisory veinlet of third cubital cell ends beyond cross-veinlet. Abdomen very short. Length 15 mm.

One specimen from East Las Vegas, New Mexico (Cockerell). Separated from allied forms by the black (instead of red) stripe under eyes, and the wholly black costal cross-veinlets.

Chrysopa arizonensis n. sp.—Face pale yellowish; a black dash below each eye extending toward mouth, inward of this and below each antennæ is a red dot, above base of antennæ is a transverse, angular, red line extending from eye to eye, its angle projecting between bases of antennæ; palpi mostly red-brown; antennæ pale. Pronotum pale, a narrow dark line on front of extreme side margins; rest of thorax and the legs pale. Abdomen pale, when fresh possibly marked with dark at bases of segments. Wings hyaline; veins green; the gradate veinlets, several basal veinlets, and parts of some of the other cross-veinlets are brown; in hind wings only a few veinlets brown. Pterostigma moderately distinct. Antennæ quite short; prothorax short, narrowed in front; wings of moderate width, pointed at tips, divisory veinlet of third cubital cell ending much beyond the first cross-veinlet from the radial sector. Length 12 mm.

One specimen from Yuma, Arizona (Morse, collector). Very easily separated from all our other species of the genus by the angular red line on head; a somewhat similar mark is in *Leucochrysa americana*.

Chrysopa plorabunda Fitch.—Pale greenish or yellowish, in life showing a paler median, dorsal stripe, often fading out in dry specimens. A straight brown mark under each eye, and sometimes a brown dot at each outer anterior corner of the pronotum. Venation pale green or yellowish; pterostigma rather distinct. Pronotum short and broad, as broad as long, sides parallel, not narrowed in front. Wings quite broad; anterior pair rounded at tip, hind wings slightly acute; divisory veinlet of third cubital usually ends on or just beyond the cross-veinlet. Length 14-15 mm.

Specimens have been seen from Columbus, Ohio, March; Agricultural College, Mich., Febr.; Boulder, Colo., Aug.; and Austin, Texas, March; also from Utica, Miss.; Ames, Iowa; and Luverne, Minn. Fitch records it from Northern Illinois and New York. The Michigan specimens had passed the winter in dead leaves and in hedges. Shimer, under the name of *Ch. illinoiensis*, has given a long account of its life history.

Chrysopa harrisii Fitch.—Pale green throughout in life, fading to yellow in dried specimens; a pale yellowish median, dorsal stripe. Cheeks suffused with reddish; sometimes a minute red dot on vertex near each eye. Venation green, pterostigma quite distinct. Antennæ moderately long; pronotum about as broad as long, sides parallel, not narrowed in front. Wings slender, acute at tips; divisory veinlet of third cubital usually ends beyond the cross-vejnlet. Length 13-15 mm.

Specimens are before me from Washington, D. C., from pine trees in July; Manchester, New Jersey, Sept.; Staten Island, New York,

Oct.; Agricultural College, Mich., July; and Mt. Washington, N. H. Fitch described it from New York in July and August. The cocoon is yellowish, and is often seen on pine-needles; the larvæ feed on *Chermes*.

Chrysopa californica Coquillett.—Pale green or yellowish, with a pale median dorsal stripe in life. Cheeks suffused with red, and often a red dot above on vertex near each eye. Venation pale green or yellowish, pterostigma moderately distinct. Pronotum about as broad as long, sides parallel, not narrowed in front. Wings rather broader than *Ch. harrisi*, and not quite as acute at tips. The divisory veinlet of third cubital ends usually at the cross-veinlet. Length 13-15 mm.

Described from California, and I have seen specimens from many places; Los Angeles, Tehama, Wanona, San Bernardino, Palo Alto, San Mateo Co., Santa Clara Co. and Siskiou Co.; mostly in July and August, but some in April. Also from Hood River, Oregon, September; Pullman, Wash., July and August; and King's Canon, Ormsby Co., Nevada, July. It is barely more than a variety of *Ch. harrisi*, but I understand that Hagen considered it a distinct species. It is the most abundant species on the Pacific Coast.

Chrysopa externa Hagen.—Pale green or yellowish, not showing a distinct pale median stripe; cheeks reddish. Venation green, pterostigma not distinct. The pronotum is about as broad as long, but the sides converge a little forward. The wings are slender and acute at tips; the divisory veinlet ends before the middle of the cell and before the cross-veinlet. The venation is not as dense as in the allied species. Length 11-14 mm.

Specimens have been seen from Las Cruces, June, Santa Fe, Aug., and Mesilla, New Mexico and also from Yuma, Arizona, and Palm Springs, Cala. (Feb. 14th). The variation upon which the specific name is based occurs also at times in the allies species, and one of Hagen's specimens, that from D. C., must have been a *Ch. harrisii*. Nevertheless I have retained the name for those specimens which show the variation in an extreme degree.

MELEOMA Fitch.

The genus has the venation about as in *Chrysopa*. The antennæ are more widely separate at base than in any of our other forms, and in the male there is an inter-antennal protuberance or horn. The basal joint of the antenna is more slender than in *Chrysopa*. The species appear to inhabit mountains. Type is *M. signoretti*.

Our three species are separated by the following table:

1. Horn of male as long as width of vertex; second and third joints of male antennæ simple; no line on cheek in either sex; gradate veinlets blackish ..... **signoretti.**
   Horn of male much smaller; a black line on cheek ....2.
2. Second and third joints of antennæ of male excavate on inner side; gradate veinlets green ..... **slossonæ.**
   Second and third joints simple; gradate veinlets blackish ..... **innovata.**

Meleoma signoretti Fitch.—Pale yellowish green. Face of male projecting in front in two reddish submedian tubercles; between antennæ arises a prominent horn which is as long as width of vertex, and projects out horizontally, its end bent vertically downward and provided with a stiff bifid brush of pale reddish hair; in the female this and the tubercle are lacking; vertex elevated transversely between the eyes. The antennæ are darkened beyond the base, but not black, in length scarcely reaching to middle of wing. Prothorax a little longer than broad, plainly narrowed in front, and with a transverse ridge beyond the middle. Venation of wing green, with the gradate veins blackish, as also the bases of the cross-veins from the radius, and one or two cross-veins in the anal region, lower half of base of third cubital cell and connecting veinlet to the radial sector and end of the divisory veinlet of third cubital cell black. Length 14-16 mm.

Specimens come from Mt. Washington and Franconia, New Hampshire, and from Sea Cliff, N. Y., July; Fitch's specimen was from the Green Mts. of Vermont. The type was, according to Hagen, purchased for the Museum of Comparative Zoology, but there is a specimen in the National Museum from the old Fitch collection.

Meleoma slossonæ Banks.—Pale green or yellowish when dry, a red-brown stripe from eye to mouth; palpi marked with reddish, a dark spot on each anterior side margin of pronotum. Venation green, many of the cross-veinlets in part black; pterostigma long and distinct. In the male there is a cavity in middle of face below antennæ, between bases of antennæ is a short, broad tubercle, trifid at tip; the vertex is transversely elevated from eye to eye. Antennæ with basal joints slender and divergent, curved, concave within, second and third joints short, fourth longer and swollen at base on inner side. In ♀ there is no tubercle, but a slight conical elevation; the basal joints of antennæ are simple, as also the fourth. Pronotum broader than long, sides nearly parallel, a little narrowed at extreme front. Wings moderately long, anterior pair rounded at apex, hind pair acute at tip. Length 18-19 mm.

Specimens have been taken by Mrs. A. T. Slosson from Mt. Washington, Crawford Notch and Franconia, New Hampshire; also seen from Brookline, Maine; and Quebec and Sherbrooke, Canada. This species differs much from *M. signoretti*, in structure of antennæ and the tubercle. Mr. McLachlan in a note in Ent. News, 1894, thinks that it is a sex of *M. signoretti;* however, there is not the slightest doubt of their distinctness, and that the female *Meleoma* is without a horn.

Oct.; Agricultural College, Mich., July; and Mt. Washington, N. H. Fitch described it from New York in July and August. The cocoon is yellowish, and is often seen on pine-needles; the larvæ feed on *Chermes*.

Chrysopa californica Coquillett.—Pale green or yellowish, with a pale median dorsal stripe in life. Cheeks suffused with red, and often a red dot above on vertex near each eye. Venation pale green or yellowish, pterostigma moderately distinct. Pronotum about as broad as long, sides parallel, not narrowed in front. Wings rather broader than *Ch. harrisi*, and not quite as acute at tips. The divisory veinlet of third cubital ends usually at the cross-veinlet. Length 13-15 mm.

Described from California, and I have seen specimens from many places; Los Angeles, Tehama, Wanona, San Bernardino, Palo Alto, San Mateo Co., Santa Clara Co. and Siskiou Co.; mostly in July and August, but some in April. Also from Hood River, Oregon, September; Pullman, Wash., July and August; and King's Canon, Ormsby Co., Nevada, July. It is barely more than a variety of *Ch. harrisi*, but I understand that Hagen considered it a distinct species. It is the most abundant species on the Pacific Coast.

Chrysopa externa Hagen.—Pale green or yellowish, not showing a distinct pale median stripe; cheeks reddish. Venation green, pterostigma not distinct. The pronotum is about as broad as long, but the sides converge a little forward. The wings are slender and acute at tips; the divisory veinlet ends before the middle of the cell and before the cross-veinlet. The venation is not as dense as in the allied species. Length 11-14 mm.

Specimens have been seen from Las Cruces, June, Santa Fe, Aug., and Mesilla, New Mexico and also from Yuma, Arizona, and Palm Springs, Cala. (Feb. 14th). The variation upon which the specific name is based occurs also at times in the allies species, and one of Hagen's specimens, that from D. C., must have been a *Ch. harrisii*. Nevertheless I have retained the name for those specimens which show the variation in an extreme degree.

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1. Horn of male as long as width of vertex; second and third joints of male antennæ simple; no line on cheek in either sex; gradate veinlets blackish ..... **signoretti.**
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2. Second and third joints of antennæ of male excavate on inner side; gradate veinlets green ..... **slossonæ.**
   Second and third joints simple; gradate veinlets blackish ..... **innovata.**

Meleoma signoretti Fitch.—Pale yellowish green. Face of male projecting in front in two reddish submedian tubercles; between antennæ arises a prominent horn which is as long as width of vertex, and projects out horizontally, its end bent vertically downward and provided with a stiff bifid brush of pale reddish hair; in the female this and the tubercle are lacking; vertex elevated transversely between the eyes. The antennæ are darkened beyond the base, but not black, in length scarcely reaching to middle of wing. Prothorax a little longer than broad, plainly narrowed in front, and with a transverse ridge beyond the middle. Venation of wing green, with the gradate veins blackish, as also the bases of the cross-veins from the radius, and one or two cross-veins in the anal region, lower half of base of third cubital cell and connecting veinlet to the radial sector and end of the divisory veinlet of third cubital cell black. Length 14-16 mm.

Specimens come from Mt. Washington and Franconia, New Hampshire, and from Sea Cliff, N. Y., July; Fitch's specimen was from the Green Mts. of Vermont. The type was, according to Hagen, purchased for the Museum of Comparative Zoology, but there is a specimen in the National Museum from the old Fitch collection.

Meleoma slossonæ Banks.—Pale green or yellowish when dry, a red-brown stripe from eye to mouth; palpi marked with reddish, a dark spot on each anterior side margin of pronotum. Venation green, many of the cross-veinlets in part black; pterostigma long and distinct. In the male there is a cavity in middle of face below antennæ, between bases of antennæ is a short, broad tubercle, trifid at tip; the vertex is transversely elevated from eye to eye. Antennæ with basal joints slender and divergent, curved, concave within, second and third joints short, fourth longer and swollen at base on inner side. In ♀ there is no tubercle, but a slight conical elevation; the basal joints of antennæ are simple, as also the fourth. Pronotum broader than long, sides nearly parallel, a little narrowed at extreme front. Wings moderately long, anterior pair rounded at apex, hind pair acute at tip. Length 18-19 mm.

Specimens have been taken by Mrs. A. T. Slosson from Mt. Washington, Crawford Notch and Franconia, New Hampshire; also seen from Brookline, Maine; and Quebec and Sherbrooke, Canada. This species differs much from *M. signoretti*, in structure of antennæ and the tubercle. Mr. McLachlan in a note in Ent. News, 1894, thinks that it is a sex of *M. signoretti;* however, there is not the slightest doubt of their distinctness, and that the female *Meleoma* is without a horn.

Meleoma innovata Hagen.—Pale green; a pale yellowish dorsal, median stripe; a red-brown stripe from each eye to mouth; palpi marked with reddish. In male the lower part of face is gibbous, a cavity above it marked with pink; between bases of antennæ a small tubercle, bifid at tip and curved downward. Basal joints of antennæ divergent, and swollen near tip, especially below, beyond simple. Female without these structural modifications, but the basal joints are widely separate at base, and much more slender than in any *Chrysopa*. Wings rather long and slender, anterior pair rounded at tip, hind pair acute at tip. Venation green, some cross-veinlets marked in part with black; pterostigma quite distinct. Pronotum broader than long, not narrowed in front. Length 18-20 mm.

I have a pair; male from Amecameca, Mexico, the female from Santa Fé, New Mexico, July. At the time of my description of *M. mexicana*, which was based on the former specimen, I had not examined Hagen's description of *Ch. innovata* carefully. It is strange that Hagen did not place this species in *Meleoma*, since he states that it possesses the very character upon which this genus was based.

EREMOCHRYSA new gen.

Characters in general those of *Chrysopa*, but there is but one (the outer) series of gradate veinlets in hind wings; the branches from the radial sector being curved and sinuate. In the forewings the inner row of gradate veinlets are only three or four in number. The wings are narrower than in most species of *Chrysopa;* the longitudinal veins are usually marked with brown, and there is usually a brown dot under the tip of each femur. Type *Ch. punctinervis* McLach.

Three species can be referred to this genus, and they may be recognized from the following table :

1. Longitudinal veins marked with brown.....2.
   Longitudinal veins not marked with brown, cross-veinlets almost wholly brown.....**hageni.**
2. Transverse veinlets wholly brown, larger species.....**fraterna.**
   Transverse veinlets interruptedly brown and pale, smaller species. **punctinervis.**

Eremochrysa hageni n. sp.—Head pale greenish yellow, a black stripe on each cheek reaching to mouth, second joint of antennæ blackish, first joint above red-brown, beyond pale, rather darker towards tips. A black spot between antennæ extending backward in the shape of a Y, its posterior tips enlarged. Palpi red-brown, pale on base. Pronotum pale, a median narrow line, and some spots each side dark; rest of thorax and the legs pale Abdomen pale, evidently with various dark marks when fresh, most of the fourth and the sixth and seventh segments red-brown above. Wings hyaline, veins mostly pale, cross-veinlets mostly dark, except those of the costal area which are dark only at subcostal

ends. Vertex of head rather elevated at the dark spots; antennæ quite short; prothorax narrowed in front. Wings narrow, tips rounded, but three gradate veinlets of inner series, four or five of outer series, but one series of gradate veinlets in hind wings. Length 10 mm.

San Antonio, Texas, and Austin, Texas, May 20th; the latter from Mr. McClendon. A very handsome and distinct species, not very closely related to any other in our fauna.

Eremochrysa punctinervis McLach.—Head yellowish; a blackish mark under each eye reaching toward mouth, a spot between base of antennæ; palpi banded with red-brown; basal joint of antennæ often with a red-brown spot on inner upper side, a narrow line on outer side; second joint often with a dark spot above, but not wholly black. Pronotum marked each side with red-brown, as likewise meso- and metathorax; abdomen somewhat marked with brown; legs pale, a brown dot under tip of each femur. Wings grayish hyaline, veins and veinlets interruptedly pale and red-brown, sometimes some of the cross-veinlets are wholly dark, gradate veinlets brown; hind wings similarly marked. Wings narrow, rounded at tip, but three or four gradate veinlets in each series, in hind wings but one (the outer) series of gradate veinlets, third cubital cell about twice as long as broad. Length 9-11 mm.

I have seen specimens from Brazos Co., Victoria (March 29th), and Austin, Texas; San Augustine, Las Vegas Hot Springs and Mesilla, New Mexico; Williams and Winslow, Arizona; Los Angeles and Palm Springs, Calif.; and Colorado. Most specimens were taken in Aug., Sept. and Oct., but those from Palm Springs were captured in Feb. and March. In life it looks quite unlike *Chrysopa*, and is of a grayish color. It appears to be the most common species of the arid region of the southwest.

Eremochrysa fraterna Banks.—Similar to *E. punctinervis*, but larger, and more marked with brown. From between the antennæ two stripes run up on the vertex, and the second joint of antennæ is wholly black; the inner orbit of each eye is margined with black. The thorax has a broad stripe on each side, and a narrow median line; there is a dark dot under the tip of each femur. The cross-veinlets of the wings are all dark, the pterostigmatic ones broadly marked with brown. Length 12 mm.

The type is from Colorado, but I have recently seen a specimen taken by Mr. Baker at King's Canon, Ormsby Co., Nevada, June 6th, which agrees with the type in every particular.

BIBLIOGRAPHY,

THOMAS SAY.—Descriptions of some new North American Neuropterous Insects, and observations on some already described.—Journ. Acad. Nat. Sci. Phila., 1839, pp. 9–46.

HERMANN BURMEISTER.—Handbuch der Entomologie, Neuroptera, vol. ii, part 3.—Berlin, 1839.

W. G. SCHNEIDER.—Symbolæ ad Monographiam generis Chrysopæ Leach.—Vratislaviæ, 1851. [Two editions, one with col ored plates.]

FRANCIS WALKER.—Catalogue of the Specimens of Neuropterous Insects in the Collection of the British Museum.—London, Part 2, 1853.

ASA FITCH.—First Report on the Noxious, Beneficial, and Other Insects of the State of New York.—Albany, 1855.

H. A. HAGEN.—Synopsis of the Neuroptera of North America.—Washington, 1861.

H. SHIMER.—Description of the Imago and Larva of a new Species of Chrysopa.—Proc. Entom. Soc. Phila., 1865, vol. iii, pp. 208-211.

R. MCLACHLAN.—New Species of Hemerobina, with Synonymic Notes.—Ent. Mo. Mag., vol. vi, pp., 21-27, 1869.

W. H. ASHMEAD.—Orange Insects.—Jacksonville, Fla., 1880.

D. W. COQUILLETT.—Chrysopa Californica.—Rept. State Board Hortic., Calif., 1890, p. 288.

NATHAN BANKS.—A Synopsis, Catalogue and Bibliography of the Neuropteroid Insects of Temperate North America.—Trans. Am. Ent. Soc., vol. xix, pp. 327-373, 1892.

A. D. MACGILLIVRAY.—New Species of Nothochrysa.—Can. Ent., 1894, pp. 169-171.

NATHAN BANKS.—New Neuropteroid Insects.—Trans. Amer. Ent. Soc., vol. xxii, pp. 313-316, 1895.

NATHAN BANKS.—A new Species of Meleoma.—Ent. News, 1896, pp. 95-96.

NATHAN BANKS.—A Leucochrysa from Florida.—Ent. News, 1897, p. 183.

NATHAN BANKS.—Three new Species of Chrysopidæ.—Proc. Ent. Soc. Wash., vol. iv, No. 2, pp. 173-175, 1898.

NATHAN BANKS.—Descriptions of new North Amer. Neuropteroid Insects.—Trans. Am. Ent. Soc., vol. xxv, pp. 199-218, 1899.

J. MCCLENDON.—A new Species of Chrysopa.—Psyche, June, 1901, 215-216.

CATALOGUE.

NOTHOCHRYSA McLachlan.

N. californica Banks, Tr. Am. Ent. Soc., xix, 373, 1892. MacGillivray, Can. Ent., 1894, 171.

ALLOCHRYSA Banks.

A. virginica Fitch, First Rept., Ins. N. Y., 91, 1856.
N. phantasma MacGillivray, Can. Entom., 170, 1894.
A. parvula Banks, *supra*.
A. annulata Mac Gillivray, Can. Entom., 169, 1894.

LEUCOCHRYSA McLachlan.

L. floridana Banks, Entom. News, 184, 1897.
? *Ch. citri* Ashmead, Orange Insects, p. 13, 1880.
L. americana Banks, Proc. Ent. Soc. Wash., iv, 175, 1898.

CHRYSOPA Leach.

C. oculata Say, Journ. Acad. Phil., viii, 45, 1839.
C. euryptera Burm., Handb., ii, 980, 1839.
C. illepida Fitch, First Rept., Ins. N. Y., 84, 1856.
C. omikron Fitch, *ibid.*, 85.
C. fulvibucca Fitch, *ibid.*, 86.
C. mississippiensis Fitch, *ibid.*
C. albicornis Fitch, *ibid.*, 84.
C. assimilis Banks, Trans. Am. Ent. Soc., xxv, 202, 1899.
C. chi Fitch, First Rept., Ins. N. Y., 87, 1856.
C. ypsilon Fitch, *ibid.*
C. chlorophana Burm., Handb., ii, 979, 1839.
C. latipennis Schneid., Monog. Chrys., 118, 1851.
C. xanthocephala Fitch, First Rept., Ins. N. Y., 85, 1856.
C. bipunctata Fitch, *ibid.*, 87.
C. transmarina Hagen, Syn. Neur. N. A., 213, 1861.
C. schwarzi Banks, *supra*.
C. nigricornis Burm., Handb., ii, 980, 1839.
C. colon Fitch, First Rept., Ins. N. Y., 88, 1856.
C. lateralis Guérin, Iconog. Règn. Anim., Ins., 388, 1844.
C. pavida Hagen, Syn. Neur. N. Am., 216, 1860.
C. columbiana Banks, *supra*.
C. lineaticornis Fitch, First Rept., Ins. N. Y., 91, 1856.
C. puncticornis Fitch, *ibid.*, 92.
? *C. ampla* Walk., B. M. Cat. Neur., 268, 1853.
C. coloradensis Banks, Trans. Am. Ent. Soc., xxii, 315, 1895.
C. sabulosa Banks, Proc. Ent. Soc. Wash., iv, 174, 1898.
C. explorata Hagen, Syn. Neur. N. Am., 217, 1860.
C. rufilabris Burm., Handb., ii, 979, 1839.
C. repleta Walk., B. M. Cat. Neur., 244, 1853.
C. attenuata Walk., *ibid.*, 242.
C. novæboracensis Fitch, First Rept., Ins. N. Y., 90, 1856.

C. interrupta Schneid., Mon. Chrys., 76, 1851.
C. tabida Fitch, First Rept., Ins. N. Y., 92, 1856.
C. bimaculata McClendon, Psyche, June 1901, 215.
C. quadripunctata Burm., Handb., ii, 980, 1839.
C. sicheli Fitch, First Rept., Ins. N. Y., 89, 1856.
C. sulphurea Fitch, *ibid.*
C. emuncta Fitch, First Rept., Ins. N. Y., 88, 1856.
C. erythrocephala Banks, Trans. Am. Ent. Soc., xxv, 201, 1899.
C. medialis Banks, *supra.*
C. cockerelli Banks, *supra.*
C. arizonensis Banks, *supra.*
C. plorabunda Fitch, First Rept., Ins. N. Y., 88, 1856.
C. pseudographa Fitch, *ibid.*, 89.
C. robertsonii Fitch, *ibid.*, 88.
C. illinoiensis Shimer, Proc. Ent. Soc. Phil., 1865, vol. iii, p. 208.
C. harrisii Fitch, First Rept., Ins. N. Y., 90, 1856.
C. californica Coquillett, Rept. Calif. State Board Hort., 1890, p. 288.
C. externa Hag., Syn. Neur. N. Am., 221, 1860.

MELEOMA Fitch.

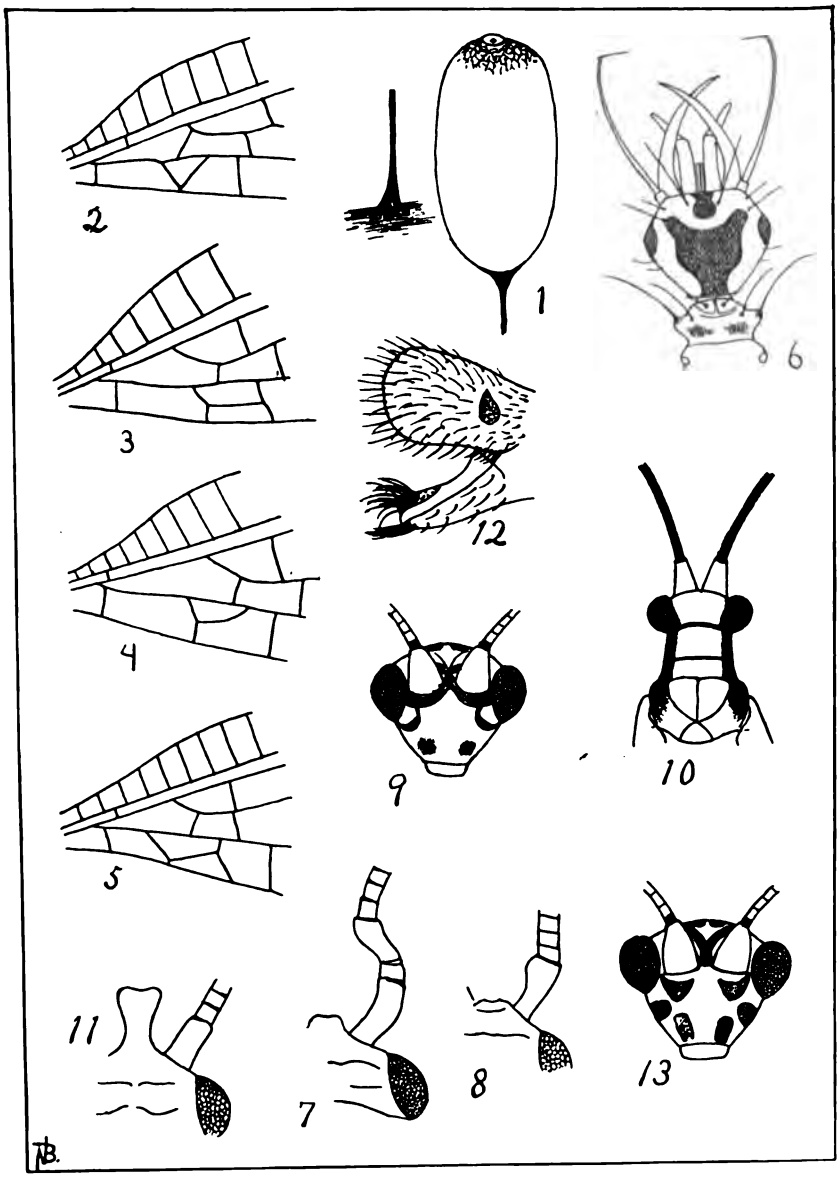
M. signoretti Fitch, First Rept., Ins. N. Y., 82, 1856.
M. slossonæ Banks, Entom. News, 1896, 95.
M. innovata Hagen, Syn. Neur. N. Am., 222, 1861.
M. mexicana Banks, Trans. Am. Ent. Soc., xxv, 201, 1899.

EREMOCHRYSA Banks.

E. punctinervis McLach., Ent. Mo. Mag., vi, 24, 1869.
E. fraterna Banks, Proc. Ent. Soc. Wash., iv. 174, 1898.
E. hageni Banks, *supra.*

EXPLANATION OF PLATE II.

Figure 1. Egg of *Chrysopa*, with base of pedicel.
" 2. Base of forewing of *Leucochrysa.*
" 3. Base of forewing of *Nothochrysa.*
" 4. Base of forewing of *Chrysopa.*
" 5. Base of forewing of *Allochrysa.*
" 6. Head of young larva.
" 7. *Meleoma slossonæ*, head of ♂.
" 8. *Meleoma innovata*, head of ♂.
" 9. *Chrysopa oculata*, face.
" 10. *Chrysopa coloradensis*, from above.
" 11. *Meleoma signoretti*, head of ♂.
" 12. *Chrysopa sabulosa*, genitalia of ♂.
" 13. *Chrysopa ypsilon*, face.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SYNOPSIS OF MEGACHILIDÆ AND BOMBINÆ.

BY CHARLES ROBERTSON.

This belongs to a series of papers—Andreninæ, Trans., 28, 187–194; Halictinæ, Can. Ent., 34, 243–250—intended to bring together in brief form the results of my studies of the local bees. My purpose primarily is to facilitate the determination of the species. Consequently, the more general groups sometimes give the common characters of the local representatives instead of those of the same groups as represented throughout the world. For example, the *Osmiini* are described as "greenish, bluish or purplish," although there are Osmiini which are black. The same applies to the colors of Stelidini. I find that all of the local species of *Cœlioxys* have the first joint of labial palpi shorter than the second. To avoid repeating that fact in the table of the species, I give it under the genus. It does not follow that all species of *Cœlioxys* agree in that respect. So in other cases, in order to avoid repetition, I have moved the statements of the common characters as far forward as possible.

Also to facilitate identification I have made tables for each sex. If you are trying to determine the female of *Andronicus*, it does not help you very much to be told how the male differs from the male of *Alcidamea*. The characters of the mouth parts are given under the females and are not repeated for the males.

In this paper vein III_1 = the vein separating the stigma from marginal cell; section 2 of vein III = the vein separating stigma from first submarginal cell; section 3 of vein III = the vein separating first submarginal cell from marginal; III_4 = third transverse cubital nervure; vein IV_2 = second recurrent nervure; vein V_2 = transverse medial nervure; section 2 of vein V = the principal section of vein separating first and second discoidal cells; vein *a* = basal nervure; vein *m* = section of subdiscoidal nervure forming lower border of third discoidal cell; segment = dorsal segment of abdomen; joint, unless otherwise indicated, refers to antennæ; supraorbital line = line drawn across vertex between summits of the eyes; malar space = space between eye and base of mandible, its length taken from the eye to a sinus a little before the middle of the base

of the mandible, its width taken on the line separating the base of the mandible.

The basal tooth of the claw in females of Megachilini is not homologous with the inner tooth of the claw in females of *Trachusa* and Anthidiinæ, as is shown by males of *Ceratias*, which have the same basal tooth and cleft claws.

Among the local Osmiini I do not find females with mandibles distinctly quadridentate, except in *Gnathosmia*. The so-called fourth tooth is a beveled angle between the two inner teeth and is only seen when the mandibles are held in a certain position. None of them have four external teeth like the female of *Andronicus*.

The difference between my arrangement of the Cœlioxyini and Stelidini and that of recent authors seems to imply that I have a different opinion as to their relationship. I hold that the arrangement proposed by these authors does not give a correct statement of their own views. There is a possibility, or probability, that *Stelis* was developed from *Dianthidium*. In that case *Stelis* and *Dianthidium* are more closely related than *Anthidium* and *Dianthidium*, and the groups should show that relationship.

I had formed the opinion that *Psithyrus citrinus* Sm. was the male of *P. laboriosus* F. before I happened to find a place where Walsh has expressed the same view, in Proc. Ent. Soc., 3, 247, 1864.

MEGACHILIDÆ.

SUBFAMILIES AND TRIBES.

Females.

Abdomen with white, yellow or red ornamentation; claws cleft.....3.
Abdomen without ornaments, except pubescent bands.
  Pulvilli absent; maxillary palpi 3-jointed; segment 1 with a broad concavity..2.
  Pulvilli present; claws simple; scopa present.....1.

1. OSMIINÆ.

Metallic greenish, bluish or purplish; maxillary palpi 5-jointed; joint 1 of labial palpi shorter than 2; abdomen at base with a slight concavity or sulcate.....OSMIINI.
Black.....TRYPETINI.

2. MEGACHILINÆ.

Scopa present; axillæ simple; pubescence of vertex, mesonotum and middle segments of abdomen more or less black.....MEGACHILINI.
Scopa absent; axillæ produced into spines on each side of scutel.
CŒLIOXYINI.

3. ANTHIDIINÆ.

Scopa present; maxillary palpi 2-jointed, joint 2 long, hairy.... ANTHIDIINI.
Scopa absent; abdomen with whitish ornaments; axillæ and scutel simple; maxillary palpi 1-jointed, short, bare; mandibles 3-dentate..STELIDINI.

Males.

Abdomen with white, yellow or red ornaments; ventral segments 6; mandibles tridentate .....3.
Abdomen without ornaments, except pubescent bands.
Pulvilli absent; mandibles at least tridentate.....2.
Pulvilli present; mandibles bidentate ..... 1.

1. OSMIINÆ.

Metallic greenish, bluish or purplish; abdomen at base with a slight concavity or sulcate; dorsal segments 7; ventral segments 5, the last usually retracted; 2 large, covering 3, except on the lateral apical angles. OSMIINI.
Black.....TRYPETINI.

2. MEGACHILINÆ..

Axillæ simple; dorsal segments 7.....MEGACHILINI.
Axillæ produced into spines on each side of scutel.....CŒLIOXYINI.

3. ANTHIDIINÆ.

Ornaments yellow or red; legs with colored markings .....ANTHIDIINI.
Ornaments whitish; legs black.....STELIDINI.

GENERA.

1. OSMIINÆ.

Females.

Malar space wanting .....2.
Malar space distinct; scopa black; face with some black hairs; vein *m* longer than section 2 of V; large.....1.
1. Clypeus with a large subquadrate emargination, with dentiform lateral angles; malar space posteriorly with a large compressed tubercle; mandibles with a large triangular inner tooth; vein *a* beyond V_2. **Ceratosmia.**
Clypeus entire, with a produced thickened margin; mandibles broad, tridentate, with a basal transverse carina; vein *a* before V_2. **Centrosmia.**
2. Mandibles with an enormous dilated basal tooth, distinctly 4-dentate; clypeus longitudinally carinate; labrum short; stigma large; vein *a* not before V_2; joints 1 and 5 of maxillary palpi minute; scopa long, dense, yellow .....**Gnathosmia.**
Mandibles simple at base.....3.

3. Front with two tubercles, one above the other; mandibles 3-dentate; clypeus with a shining, somewhat concave, edge; vein *a* not before V_2; scopa white..... **Diceratosmia.**
   Front without tubercles..... 4.
4. Scopa yellowish; mandibles 4-dentate; vein *a* not before V_2. **Xanthosmia.**
   Scopa black..... **Osmia.**
   Scopa white; mandibles 4-dentate..... 5.
5. Vein *a* before V_2; clypeus rather strongly emarginate, with a rather dense apical fascia of dull whitish pubescence; front usually with an opaque blackish patch..... **Monilosmia.**
   Vein *a* not before V_2..... 6.
6. Clypeus subquadridentate, with a median emargination and two lateral teeth. **Leucosmia.**
   Clypeus entire; scopa sometimes blackish on segments 5–6; joint 5 of labial palpi minute..... **Osmia.**

Males.

Apical margin of segment 7 strongly bidentate..... 3.
Apical margin of segment 7 entire or slightly emarginate, of 6 entire..... 1.
1. Middle tarsi broad, three-sided; joint 3 of antenna equals 4; hind metatarsi arcuate, clavate; hind spur enormous, twice as long as its fellow spur. **Centrosmia.**
   Middle tarsi simple..... 2.
2. Intermediate femur produced beneath; antenna longer than thorax, joint 4 = 2 + 3; hind metatarsus toothed beyond middle; pubescence mixed with black..... **Ceratosmia.**
   Intermediate femur simple; joint 3 of antenna longer than 4; pubescence pale; small..... **Leucosmia.**
3. Segment 6 entire medially, strongly sinuate and strongly dentate laterally; front with two tubercles, one above the other.... **Diceratosmia.**
   Segment 6 more or less notched medially, not strongly sinuate or dentate... 4.
4. Ventral segment 1 emarginate; notch on 6 above broad, shallow; joint 4 of antenna about equals 2 + 3..... **Xanthosmia.**
   Ventral segment 1 entire..... 5.
5. Antenna moniliform; hind metatarsus arcuate, clavate; hind spur large. **Monilosmia.**
   Antenna filiform; hind metatarsus and hind spur ordinary..... **Osmia.**

TRYPETINI.

Females.

Section 3 of vein III longer than III_1..... 2.
Section 3 of vein III not longer than III_1; mandibles tridentate; scopa whitish..1.
1. Segment 1 subtruncate, with a punctate concavity bounded by a salient rim; mandibles short, broad; joint 1 of labial palpi less than one-half as long as 2, 3-4 lateral; coarsely punctured..... **Trypetes.**

Segment 1 rounded, with a narrow sulcus; clypeus broadly emarginate; mandibles slender; maxillary palpi 4-jointed; joint 1 of labial palpi stout, less than one-third as long as 2, 3 = 4, 4 oblique; finely punctured. **Prochelostoma.**

2. Segment 1 with a wide impunctate concavity; mandibles tridentate; maxillary palpi 4-jointed; joint 1 of labial palpi one-fifth longer than 2; scopa yellowish..... **Ashmeadiella.**

Segment 1 with a narrow sulcus; maxillary palpi 5-joint; joint 1 of labial palpi two-fifths shorter than 2..... .....3.

3. Mandibles 4-dentate; clypeus finely punctured; scopa yellowish; larger. **Andronicus.**

Mandibles 3-dentate; clypeus coarsely punctured; scopa whitish; smaller. **Alcidamea.**

Males.

Section 3 of vein III longer than III_1; dorsal segments 7.....2.

Section 3 of vein III not longer than III_1; antenna simple .....1.

1. Segment 1 subtruncate, with a punctate concavity bounded by a salient rim; abdomen with 6 visible segments above, 2 beneath; ventral segment 1 gibbous, produced over middle of 2; dorsal segment 6 entire, clasping apex of ventral segment 1 ..... **Trypetes.**

Segment 1 rounded, with a narrow sulcus; abdomen with 7 visible segments above, 4 beneath; dorsal segment 7 with two apical spines and two dentiform lateral angles ..... **Prochelostoma.**

2. Flagellum simple, short, intermediate joints about one-half as long as the last; segment 1 with a wide impunctate concavity; 6 with 4 equidistant teeth, the median ones longer, subtruncate; 7 short; ventral segments 3..... **Ashmeadiella.**

Flagellum with some joints deformed; ventral segments 5; dorsal segment 1 with a narrow sulcus.....3.

3. Joints 4-7 dilated, 8-9 broader than long, 10-13 longer than broad; segment 7 broadly rounded, a little dilated, foveate; ventral segment 1 produced to a spine, 2 broad and concave, 4 with lateral apical angles visible. **Andronicus.**

Joints 4-12 at least broader than long, 13 produced to a curved point; dorsal segment 6 with lateral apical spines ... .**Alcidamea.**

2. MEGACHILINÆ.

MEGACHILINI.

Females.

Mandibles slender, not expanded at apex, tridentate; clypeus excavated, with lateral tubercles; claws with a blunt basal tooth; stigma long and narrow; vein *m* longer than section 2 of V; joint 3 maxillary palpi hairy, longer than 1 + 2; joint 1 of labial palpi one-sixth longer than 2. **Chelostomoides.**

Mandibles broad at apex..... .....1.

1. Body short, robust; abdomen cordate, broad and slightly convex above; segments 2-3 of about equal width, 4 narrower; 6 much longer than 5, straight or slightly concave and lipped in profile; claws with an acute basal tooth.....4.
   Body long, slender; abdomen oblong, more cylindrical; segments 2-4 of about equal width; 6 in profile convex to base of distinct lip; scopa whitish, black on segment 6.....2.
2. Joint 3 of maxillary palpi hardly pubescent, shorter than 1 + 2; claws with sharp basal teeth; segments 2-4 without whitish pubescent fasciæ in basal grooves; 6 longer than 5; joint 1 of labial palpi shorter than 2; third tooth of mandibles subquadrate, truncate, beveled...**Ceratias.**
   Joint 3 of maxillary palpi strongly pubescent, longer than 1 + 2; claws with blunt basal teeth; segments 2-4 with whitish pubescent faciæ in basal grooves; 6 hardly longer than 5, much higher than long, abruptly declining to short lip; labial palpi with joint 1 longer than 2; third tooth of mandibles acute; middle teeth farthest apart.....3.
3. Clypeus truncate or slightly tuberculate; joint 1 of labial palpi one-fifth longer than 2; length 8-11 mm.....**Oligotropus.**
   Clypeus strongly 6-dentate; joint 1 of labial palpi one-fourth longer than 2; length 13-14 mm.....**Gnathodon.**
4. Mandibles 4-dentate.....**Megachile.**
   Mandibles 5-dentate; scopa yellow; disc of segment 6 with long erect hairs; joint 1 of labial palpi a little shorter than 2.....5.
5. Hairs on segment 6 yellowish; length 13-15 mm.....**Xanthosarus.**
   Hairs on segment 6 black; length 11 mm.....**Anthemois.**

Males.

Mandibles without a great tooth below; segment 6 with a low carina, emarginate in the middle, apical margin with 4 blunt teeth; 3 ventral segments; cheeks distinctly punctured; front and middle tibiæ and front tarsi red anteriorly; front tarsi simple; mesonotum in front bilineate with white pubescence.....**Chelostomoides.**

Mandibles with a great tooth below.....1.

1. Front tarsi simple, not flattened, black, or nearly; 4 ventral segments.....5.
   Front tarsi flattened.....2.
2. Coxal spines nearly obsolete; 3 ventral segments; joint 13 of antenna simple; front tarsi black, joints 1-3 flattened, 4 simple but wider than long; inferior manibular tooth a little before the middle; segment 6 with two compressed teeth; apical margin with two teeth on each side, the lateral ones stronger; 7 not produced; cheeks with long white hair; pubescent fasciæ on apical margins and basal grooves, more dense in the latter.....**Oligotropus.**
   Coxal spines distinct; joint 13 of antenna broad and flat; front tarsi colored...3.
3. Anterior coxæ bare in front and with one or more bristles; front tarsi whitish, joint 1 with a boat-shaped scale; lower angle of cheek grooved, with a posterior spine; segment 9 with carina ordinary, apical margin with a carina on each side, but no spines; 7 pointed; ventral segments 4; claws cleft and with an acute basal tooth.....**Ceratias.**

Anterior coxæ without bristles in front; front metatarsus without a boat-shaped scale; apical margin of segment 6 with two teeth on each side; claws without distinct basal teeth ... .4.

4. Mandibular tooth basal; cheek beneath with a large scale-like process; front coxæ bare anteriorly, with large apical spines; front tarsi strongly fringed, joint 1 hollowed out beneath; middle femur enormous; segment 6 with strong deeply notched carina, apical margin with median teeth stronger; 7 outwardly arcuate, sometimes slightly dentate; ventral segments 4.....**Xanthosarus.**

Mandibular tooth a little beyond the middle; cheek unarmed; front coxæ with subapical spines; front and middle tarsi and hind ones more or less red; front tarsi hardly fringed; joints 1-2 flattened, 3-5 simple; segment 6 with two compressed teeth, apical margin with lateral teeth stronger; 7 inwardly arcuate; apex of clypeus emarginate; cheeks beneath with long white hair; pubescent fasciæ more dense in basal grooves; ventral segments 3.....**Gnathodon.**

5. Coxal spines strongly developed; abdomen broad; segment 6 with the carina transverse, strongly notched or denticulated; mandibles 3-4 dentate. **Megachile.**

Coxal spines not strongly developed; mandibles 3-dentate.....6.

6. Spines wanting; carina on segment 6 high, entire or nearly so, the edge at most slightly denticulated; apical margin with two lateral teeth; 7 pointed .....**Anthemois.**

Spines reduced to short teeth or dentiform angles; abdomen slender; segment 6 with the base gibbous, carina arcuate, moderately notched, apical margin with lateral spine and inner dentiform carina; 7 rounded. **Cyphopyga.**

COELIOXYINI.

Females.

Abdomen conical; eyes hairy; front coxæ spined; joint 1 of labial palpi shorter than 2; mandibles tridentate; claws simple or with a blunt basal tooth .... **Cœlioxys.**

Males.

Eyes hairy; front coxæ spined; segment 6 with 6-8 more or less evident spines. **Cœlioxys.**

3. ANTHIDIINÆ.

ANTHIDIINI.

Females.

Pulvilli absent; mandibles 7-dentate; wing hyaline; section 2 of vein III shorter than III_1; vein IV_2 a little beyond III_4; vein *a* well before V_2; ornaments pale yellow.....**Anthidium.**

Pulvilli present; mandibles 5-dentate; wings clouded; section 2 of vein III about as long as III_1; vein IV_2 well beyond III_4; vein *a* little before V_2; ornaments orange-yellow or red.....**Dianthidium.**

Males.

Pulvilli absent; segment 6 with two lateral spines, 7 with three terminal ones; ornaments pale yellow.....**Anthidium.**
Pulvilli present; ornaments orange-yellow; legs largely red..**Dianthidium.**

STELIDINI.

Females.

Abdomen conical; segment 6 longer than 5, with carinate border; ventral segment 6 longer than 5, produced and curved downward, with a transverse preapical carina; head with whitish ornaments; mandibles tridentate; vein IV_2 before III_4; vein *a* opposite V_2....**Stelidium.**
Abdomen depressed; segment 6 not reflexed or carinate; head without whitish ornaments; vein *a* opposite or a little before V_2.....**Microstelis.**

Males.

Head with whitish marks; abdomen conical.....**Stelidium.**
Head black; abdomen ovate.....**Microstelis.**

SPECIES.

1. OSMIINÆ.

OSMIINI

Ceratosmia lignaria Say.
Centrosmia gn. nov. (Type *Osmia bucephala* Cresson), *bucephala.*

OSMIA Panzer.

Females.

Scopa white, sometimes blackish on segments 5–6; clypeus entire; joint 5 of maxillary palpi minute.....pumila.
Scopa black.....1.
1. Head with pubescence pale.....3.
   Head with pubescence more or less black; mandibles 4-dentate.....2.
2. Bright blue or purple; mesonotum with pubescence mixed with black. cobaltina.
   Dull blue green; mesonotum with pubescence hardly mixed with black. brevis.
3. Length 11 mm.; mandibles 4-dentate.....major.
   Length 8 mm.; mandibles 3-dentate.....atriventris.

Males.

Segment 6 strongly notched; dull greenish.....2.
Segment 6 at most with a shallow notch.....1.
1. Bright golden green, abdomen more purplish.....cobaltina.
   Brassy green; margin of segment 6 testaceous.....pumila.
2. Length 10 mm.....major.
   Length 8 mm.....atriventris.

Xanthosmia gn. nov. (Type *Osmia cordata* Rob.) *cordata.*
Gnathosmia gn. nov. (Type *Osmia georgica* Cresson) *georgica.*
Monilosmia gn. nov. (Type *Osmia canadensis* Cresson) *canadensis.*
Diceratosmia gn. nov. (Type *Osmia quadridentata* Cresson) *quadridentata.*
Leucosmia gn. nov. (Type *Osmia albiventris* Cresson) *albiventris.*

TRYPETINI.

Andronicus cylindricus Cresson.

ALCIDAMEA Cresson.

Females.

Scutel swollen; head beneath smooth, shining, impunctate, edge of cheeks beneath with a row of long incurved hairs; clypeus with a median raised line ..... **truncata.**
Scutel moderately convex; head beneath punctate, long, pilose; clypeus without a raised line ..... **producta.**

Males.

Segment 7 broadly rounded; ventral segment 2 longest, with a transverse subapical ridge ..... **truncata.**
Segment 7 produced into a spine; ventral segment 2 with a great tooth-like process ..... **producta.**

Prochelostoma gn. nov. (Type *Heriades philadelphi* Rob.) *philadelphi.*

TRYPETES Schenck.

Females.

Lower border of mandibles simple; clypeus emarginate, sides with two or three denticles; maxillary palpi 3-jointed; a little smaller..... **carinatus.**
Lower border of mandibles sinuate at base, with submedian dentiform angle; apical margin of clypeus straight, with a distinct lateral tooth; maxillary palpi 4-jointed; a little larger ..... sp. nov. **barbatus.**

Males.

Ventral segment 2 subtruncate; antenna longer, joint 3 about one-half as long as 4; flagellum testaceous; clypeus moderately bearded..... **carinatus.**
Ventral segment 2 produced to a point; antenna shorter, joint 3 more than one-half as long as 4; flagellum blacker; clypeus strongly bearded. **barbatus.**

Ashmeadiella bucconis Say.

2. MEGACHILINÆ.

MEGACHILINI.

Chelostomoides ruffmanus Rob.
Oligotropus gn. nov., *campanulæ* sp. nov.

CERATIAS gn. nov. (Type *Megachile pugnatus* Say).

Females.

Cheek broad, with a great tooth beneath; clypeus short, with a median process and a tubercle on each side; mandibles 5-dentate, inner tooth small. **pugnatus.**

Cheek unarmed; clypeus bisinuate, with a median angle and two teeth on each side; dorsal segment 6 with an abrupt apical lip; mandibles 4-dentate, the inner tooth most prominent ..... **sayi.**

Males.

Middle metatarsus broader than the tibia; front and middle femora and tibiæ red; boat-shaped scale subtruncate and with the scale on joint 2 produced to the tip of joint 3; front trochanter and coxa yellowish; front coxa with a single long bristle ..... **pollicaris.**

Middle metatarsus narrower than tibia, more or less colored; front and middle femora and tibiæ black, or nearly so; front trochanter and coxa black; boat-shaped scale somewhat pointed ..... 1.

1. Scale strongly produced, about equaling the tip of joint 3, at base within with a short line of black pubescence; coxal bristles 2-3, long.. **pugnatus.**

Scale hardly produced, about equaling tip of joint 2, edged with fuscous pubescence; coxal bristles 4-5, short..... **sayi.**

Gnathodon gn. nov. (Type *Megachile georgica* Cresson) *georgicus.*
Xanthosarus gn. nov. (Type *Megachile latimanus* Say) *latimanus.*
Cyphopyga gn. nov. (Type *Megachile montivaga* Cresson) *montivaga.*
Anthemois gn. nov. (Type *Megachile infragilis* Cresson) *infragilis.*

MEGACHILE Latreille.

Females.

Scopa yellow; disc of segment 6 in profile straight, with minute appressed black hairs; hind metatarsus narrower than tibia; joint 1 of labial palpi one-fifth shorter than 2..... **mendica.**

Scopa white..... ..... 1.

1. Posterior ocellus nearer the edge of the vertex than to the nearest eye, the edge passing in front of supraorbital line; segment 6 in profile straight, clothed with appressed sericeous pubescence and long sparse black hairs; hind metatarsus as broad as tibia; joint 1 of labial palpi one-sixth longer than 2 ..... **petulans.**

Posterior ocellus not nearer the edge of the vertex than to the nearest eye..2.

2. Disc of segment 6 in profile straight or slightly concave, with minute appressed pubescense..... ..... 5.

Disc of segment 6 with long erect hairs, more dense and appressed apically..3.

3. Hair of segment 6 almost entirely black; margin of clypeus denticulate; joint 1 of labial palpi a little longer than 2 ..... **addenda.**

Hair of segment 6 black at base, whitish apically; in profile more distinctly concave before an apical lip; clypeus entire; joints 1-2 of labial palpi equal..... ..... 4.

4. Segment 6 finely and closely punctured; black; pale pubescence white; hair of ventral segment 6 black ..... **generosa.**
   Segment 6 more densely and coarsely punctured; less black; pale pubescence griseous; hair of ventral segment 6 usually whitish ..... **brevis.**
5. Middle and hind metatarsi as wide as their tibiæ; ventral segment 6 reflexed behind dorsal segment; margin of clypeus shining, with a median dentiform carina; joint 1 of labial palpi one-sixth shorter than 2. **sexdentata.**
   Middle and hind metatarsi narrower than their tibiæ; joint 1 of labial palpi one-fourth shorter than 2; rather small and slender. **Cyphopyga montivaga.**

Males.

Spines on apical margin of segment 6 long, quite distinct; carina strongly produced, narrow, with deep rounded notch and strong incurved teeth; 7 usually produced, truncate or emarginate; mandibles 4-dentate, middle tooth notched; pubescence of vertex and mesonotum rarely mixed with black ..... **sexdentata.**
Spines on apical margin of segment 6 short, more or less concealed ..... 1.
1. Pubescence pale yellowish or griseous, rarely mixed with black; segment 6 with carina jagged, middle usually notched, apical margin with a lateral tooth and an inner dentiform carina nearer the lateral tooth than its fellow of the opposite side; mandibles 3-dentate ..... **brevis.**
   Pubescence mixed with black above ..... 2.
2. Carina of segment 6 straight or concave laterally, widely notched, forming two great, usually jagged teeth; 7 produced into a long spine; mandibles 4-dentate; front tarsi strongly ciliate ..... **addenda.**
   Carina of segment 6 convex laterally ..... 3.
3. Lateral ocellus nearer the edge of vertex than to nearest eye; carina strongly produced and notched, its margin nearly entire; apical margin of segment 6 with two lateral teeth and two median carinæ; 7 truncate; mandibles 4-dentate, median tooth notched ..... **petulans.**
   Lateral ocellus not nearer the edge of vertex than to nearest eye; carina ordinary, its margin jagged; margin of segment 6 with four teeth; 7 pointed; mandibles 3-dentate; front tarsi strongly ciliate ..... 4.
4. Pubescence white; median tooth of segment 6 nearer the lateral one than to its fellow of the opposite side; larger ..... **generosa.**
   Pubescence more ochraceous; median tooth of segment 6 nearer its fellow than to the lateral one; smaller ..... **mendica.**

COELIOXYINI.

COELIOXYS Latrielle.

Females.

Clypeus bilobed; segment 6 rather abruptly narrowed ..... **sayi.**
Clypeus regularly convex ..... 1.
1. Segment 1 with basal and apical fasciæ; edge of concavity carinate; 6 with a terminal reflexed spine; ventral segment 6 broadly rounded, mucronate, black ciliate ..... **modesta**
   Segment 1 with apical fasciæ, edge of concavity hardly carinate ..... 2.

2. Scutel with a median spine; angle of metathorax spinous .....**germana.**
   Scutel rounded or with a blunt tubercle.....3.
3. Segments 2-4 without oblique basal fasciæ.....5.
   Segments 2-4 with oblique basal fasciæ.....4.
4. Femora and tibiæ and tarsi black; ventral segment 6 narrow.....**alternata.**
   Femora and tibiæ red, tarsi black; ventral segment 6 broad.....**texana.**
5. Segment 6 strongly abruptly narrowed, presenting a lateral angle; legs black, tarsi red.....**rufitarsis.**
   Segment 6 slightly sinuate laterally; legs red; small .....**octodentata.**

Males.

Cheek beneath broad, punctate, concave, posterior edge carinate; segments 2-3 with basal interrupted pubesent fasciæ; 5 without lateral spines; 6 with two lateral and six short terminal spines, the median sulcus about two-thirds the width of the segment; 7 visible as a pubescent spine; ventral segments 4.....5.

Cheek with posterior inferior angle beveled or grooved; segments 2-3 without basal fasciæ; 5 with lateral apical spines; 6 with two lateral and four long terminal spines, the median sulcus about one-third the width of the segment; 7 retracted .....1.

1. Scutel with a median spine; ventral segments 5, 4 sulcate, bidentate; cheek with deep shining impunctate groove; face densely pubescent. **germana.**
   Scutel rounded or with a slight median tubercle; ventral segments 4, 5 retracted .....2.
2. Segment 1 with basal and apical fasciæ, edge of concavity carinate; beveled space of cheek small, shining; apical spines closely approximated, the interval with blackish hairs; middle of mandibles red; ventral segment 4 emarginate.....**modesta.**
   Segment 1 with apical fasciæ, edge of concavity hardly carinate .....3.
3. Bevel of cheek small, rather opaque and rough; disc of abdomen opaque, densely punctured; transverse basal sulcus on segment 2 deep; ventral segment 4 bidentate; legs black, tarsi red; large .....**rufitarsis.**
   Bevel of cheek larger, shining, impunctate; ventral segment 4 entire.....4.
4. Disc of abdomen shining, rather sparsely punctured, sulcus on segment 2 rather shallow; legs black, tibiæ and tarsi more or less tinged with red .....**sayi.**
   Disc of abdomen opaque, densely punctured; sulcus on segment 2 deep; legs red .....**octodentata.**
5. Femora and tibiæ and tarsi black; punctures of abdomen finer, more close; ventral segment 4 bispinous .....**alternata.**
   Femora and tibiæ largely red, tarsi black; punctures coarser, more sparse; ventral segment 4 bidentate.....**texana.**

3. ANTHIDIINÆ.

ANTHIDIINI.

ANTHIDIUM Fabricius.

Females.

A longitudinal stripe on each side of vertex; face, clypeus, mandibles and bases of tibiæ black; segments 2-5 with lateral fasciæ greatly indented anteriorly; apex of clypeus with two teeth on each side ....psoraleæ.

A transverse stripe on each side of vertex; face, clypeus, mandibles and bases of tibiæ marked with yellowish; segments 2-4 with two spots on each side ..... cognatum.

Males.

Lateral spines on segment 7 with incurved points; ventral segments 4-5 emarginate; 6 with broad produced median portion having the sides of its base sinuate; longitudinal stripe on each side of vertex; segment 6 with two discal comma-shaped marks.....psoraleæ.

Lateral spines on segment 7 broadly rounded; ventral segment 4 with one, 6 with three compressed apical teeth; scape in front, transverse stripe on each side of vertex, stripe on anterior and middle tibiæ, spot on base of hind ones, two discal subquadrate spots on segment 6, yellowish ..... cognatum.

DIANTHIDIUM Cockerell.

Male.

Segment 6 with a median raised line, on each side an elevated portion terminating in a discal subapical tooth and a lateral apical one; 7 emarginate, with a median carina terminating in a tubercle.....boreale.

STELIDINI.

Stelidium trypetinum Rob.

MICROSTELIS gn. nov. (Type *Stelis lateralis* Cresson).

Females.

Abdomen with narrow fasciæ continuous or interrupted; vein IV_2 usually before III_4 ..... fœderalis.

Abdomen 8-14 spotted; vein IV_2 usually opposite or beyond III_4 ....lateralis.

Males.

Ventral segment 3 with a median apical dentiform carina; dorsal segments 1-5 with narrow continuous or interrupted fasciæ.....fœderalis.

Ventral segment 3 simple; dorsal segments 1-5 with lateral spots ....lateralis.

BOMBINÆ.

Females.

Hind tibia convex, evenly hairy, the hairs short; vertex yellow..**Psithyrus.**
Hind tibia more or less concave, bare, the edges with long hairs forming the corbicula or pollen-basket.....1.
1. Ocelli small, near supraorbital line, above the narrowest part of the front, the lateral ones about as far from the eye as from each other...**Bombus.**
Ocelli large, below supraorbital line, in the narrowest part of the front, the lateral farther from each other than from the eye.....**Bombias.**

Males.

Malar space much shorter than wide; ocelli large, frontal, the lateral one less than its diameter from the eye; eyes large; front narrow; vertex depressed; joint 3 as long as, or longer than, 5; vertex yellow in local species; posting themselves on some high stand and repeatedly flying out and returning.....**Bombias.**
Malar space about as long as wide; ocelli small, vertical, the lateral ones about as far as from the eye as from each other; eyes small; front broad; joint 3 usually shorter than 5.....1.
1. Outer face of hind tibia bare, or nearly so, the posterior border with long hair. **Bombus.**
Outer face of hind tibiæ with hair not much shorter than that of posterior border.....2.
2. Vertex black; a black band between the wings.....**Bombus.**
Vertex with yellow; a black patch between the wings; malar space a little shorter than wide; "genitalia, squama and lacinia membranous." **Psithyrus.**

BOMBIAS gn. nov. (Type *B. auricomus* nom. nov.).

Females.

Lateral ocellus about one-half as far from supraorbital line as from the nearest eye; thorax yellow, disc mixed with black; segment 1 and basal middle of 2 yellow, the latter sometimes inclining to reddish; malar space shorter than wide.....**separatus.**
Lateral ocellus about as near the eye as to supraorbital line; thorax in front yellow.....1.
1. Base of labrum with transverse, narrowly interrupted ridge; joint 3 = 4 + 5, the latter equal; vertex entirely, or with two lines or two tufts, yellow; scutel mixed with yellow and black, sometimes entirely yellow or black; segments 2-3 yellow; 1 black, always so in the middle, the black hairs often extending upon the basal middle of 2, sometimes yellow on the sides; malar space about as long as wide..**auricomus.**
Base of labrum with two widely separated tubercles; joint 3 a little shorter than 4 + 5, 5 longer than 4; malar space about one-half as long as wide; scutel and segments 1 2 yellow.....**scutellaris.**

Males.

Ocelli in narrowest part of front, lateral one about one-half its diameter from eye; malar space about one-third as long as wide; joint 3 = 5; segment 1 yellow, this color extending upon 2, usually on basal middle, and inclining to reddish; mesonotum yellow, disc often with black hairs ..... **separatus.**

Ocelli below narrowest part of front, lateral one less than one-half its diameter from eye; mesonotum yellow, with a transverse or rounded patch of black hair ..... 1.

1. Joint 3 = 4 + 5; lateral ocellus almost touching eye; front above narrower than space occupied by ocelli; malar space about one-half as long as wide; segments 1-3 yellow, rarely 4 also, 1 usually more or less black in the middle and in front ..... **auricomus.**

   Joint 3 = 5; front above about equals space occupied by ocelli; malar space transverse linear; segments 1-2 yellow ..... **scutellaris.**

BOMBUS Latreille.

Females.

Vertex yellow; mesonotum yellow ..... 2.

Vertex black; mesonotum with a yellow band in front; base of labrum with two tubercles ..... 1.

1. Scutel and segments 1-4 yellow; malar space a little longer than wide. **pennsylvanicus (= fervidus).**

   Scutel black, often mixed with yellow; segments 2-3 yellow; 1 yellow, mixed with black on the lateral basal angles, or the entire basal portion black, the apical margin always yellow, the yellow hairs more abundant in the middle; malar space about as long as wide. **americanorum.**

2. Segment 1 yellow; disc of mesonotum without black; labrum with basal ridge forming a subquadrate sinus nearly reaching apical margin; malar space shorter than wide ..... **virginicus.**

   Segments 1-2 more or less yellow; mesonotum with black hairs; base of labrum with two tubercles; malar space longer than wide ..... 3.

3. Segment 2 yellow on basal middle ..... **ridingsii.**

   Segment 2 yellow, sometimes more or less black apically ..... **consimilis.**

Males.

Hind tibia rather evenly clothed with short hair; antenna long, joint 5 nearly so long as 3 + 4; vertex and band between the wings black; segments 1-4 yellow; 5-7 yellow, black or fulvous, or yellow with fulvous tip, yellow with black tip, or black, with fulvous tip.... **americanorum.**

Hind tibia with short sparse hair on outer face, posterior border with hair as long as diameter of the joint; vertex, segment 1 and mesonotum yellow, the latter usually with black hairs on the disc ..... 1.

1. Malar space a little shorter than wide; joints 3 and 4 subequal; segment 2 at most with a little yellow on basal middle ..... virginicus.
   Malar space longer than wide; joint 3 longer than 4; segment 2 largely yellow ..... 2.
2. Joint 3 usually as long as 5; segment 2 more or less black on the sides and apical middle, 4 sometimes a little yellow ..... ridingsii.
   Joint 3 shorter than 5; segment 2 yellow ..... consimilis.

PSITHYRUS Lepeletier.

Females.

Abdomen finely punctured, pubescence short, fine, black, rarely a little yellow on lateral apical margins of segment 4; pleura and space between wings black; wings darker ..... variabilis.

Abdomen coarsely punctured, pubescence long, coarse, blunt, segment 3 usually, 1, 2 and 4 often, more or less yellow laterally; pleura yellow; mesonotum yellow, with some black hairs on disc; wing paler. laboriosus.

Males.

Abdomen with lateral apical margins of segments 3-4, basal angles of 5, and sometimes sides of 1 and 2, yellow ..... variabilis.

Abdomen with segment 1, and 2 except basal angles, yellow; 3 yellow, or black, with sides yellow ..... laboriosus.

Carlinville, Illinois.

Classification of Bees of the Genus BOMBOMELECTA.

BY H. L. VIERECK.

This synopsis is the result of a study of all material available at the Academy of Natural Sciences, Philadelphia, comprising all the described species of North America.

Females.

Pygidial area cuneiform, flat.....1.
Pygidial area with the sides parallel or nearly, usually elevated along the middle .....2.
1. First joint of flagellum distinctly longer than the second; first abdominal segment with pale pubescence.....**thoracica** Cress.
First joint of flagellum about equal to the second; first abdominal segment black.....**zygos** n. sp.
2. Ten mm. long; abdomen maculated with white bars of appressed pubescence. **arizonica** Ckll.
Larger, 12 mm. and over. abdomen if spotted not distinctly.....3.
3. Abdomen all black, excepting thin bands of light brown appressed pubescence. **larrea** Ckll.
Abdomen with pale long pubescence on first segment.....4.
4. Dorsulum with a band of black hair extending from one wing to the other. **separata** Cress.
Pubescence of dorsulum concolorous.....5.
5. Pubescence of dorsulum pale ochraceous.....**pacifica** Cress.
Pubescence of dorsulum orange fulvous.....**fulvida.**

Males.

First joint of flagellum distinctly longer than the second.....1.
First joint of flagellum distinctly shorter than the second.....3.
1. Joints of flagellum remarkably thickened; second joint broader than long. All except dorsulum with black pubescence.....**azygos** n. sp.
Joints of flagellum slender; second joint longer than broad.....2.
2. Pubescence ranging from almost white to pale ochraceous and yellow ochraceous.....**pacifica** Cress.
3. Face with white pubescence; abdomen with bands of white appressed pubescence.....**alfredi** Ckll.
Face with black pubescence; abdomen all black.....**edwardsii** Cress.

Bombomelecta zygos n. sp.

♀.—Length 14 mm.—*Head* covered with indistinct punctures, hidden in greater part by the long black hair which occupies all of the head except the margin of the occipital region. The ocelli placed on an imaginary straight line, the distance between the lateral ones about, equal to the distance between them and the nearest eye margin. A distinct thin keel medially placed between the insertion of the antennæ, continued as a raised line and then a streak up to the

middle ocellus, below this keel is continued nearly half way down the clypeus as a raised line. Eyes nearly parallel, the space between on a line drawn across the middle of the clypeus less than the space between on a line drawn across the front anterior to the middle ocellus. Clypeus convex, with a narrow polished margin. Labrum concave, the punctures coarse close together but not well defined; sparsely covered with bristles, more copiously with short soft hairs. Mandibles curved, the tip of one extending almost as far as its fellow. Scape about as long as the first three joints of flagellum combined, hardly thicker than the flagellum.

Thorax.—Sculpture of dorsum largely hidden by the abundant pale dull yellowish pubescence, the exposed portions closely indistinctly punctured, granular. Scutellum with a stout spine on each side directed backward, the spine as long as the pubescence, about one mm. Metathorax on the posterior aspect sparsely covered with black hairs, indistinctly punctured and dullish except for a triangular area which is depressed along the middle, rugulose near its base in greater part smooth and shining; the apex of this triangular area is about two-thirds the distance from the superior margin of the posterior aspect of the metathorax, from this apex to the insertion of the abdomen is a narrow sulcus. Sides of the thorax thickly clothed with black pubescence, the sculpture like that outside of the triangle on the metathorax. Legs in greater part covered with short black hairs; tarsal claws cleft the parallel tooth extending nearly to the middle of the long claws. Wings hyaline darkened with brown but not strongly, nervures black or almost; first recurrent nervure received by the second submarginal cell a little beyond the middle, the second recurrent received by the third submarginal cell at the middle or nearly; transverse median nervure in posterior wings originating some distance before the origin of the cubitus.

Abdomen with minute indistinct punctures separated by small spaces; some bristle like hairs at base, sides and on the margins of slight depressions on the segments, otherwise covered with a fine appressed dark (black) pubescence which almost hides the character of the sculpture and has brown, purple and bluish reflections in certain lights, the rich deep royal blue predominating. Pygidial area with slightly raised margins, finely granular, dullish

Jet Black excepting antennæ, mandibles and legs which have a more or less brownish tendency.

Type, Coll. Am. Ent. Soc. Type locality, California.

May be the ♀ of *B. edwardsii* Cress.

Bombomelecta arizonica Ckll.

Type loaned to Acad. Nat. Sci. Phila. Type locality, Tempe, Arizona.

Tempe, Arizona, March, at flowers of *Sphæralcea variabilis*

Bombomelecta larreæ Ckll.

Can. Ent. Lond. Ont., Dec., 1900, p. 361, ♀, 12.5 mm.

Type loaned to Acad. Nat. Sci. Phila. Type locality, Mesilla Park, N. M.

Mesilla Park, N. M., 9, v, 1900, at flowers of *Larrea tridentata* (Ckll.)

Bombomelecta separata Cress.

Trans. Am. Ent. Soc., vii, 1879, p. 204, ♀.

Type, Coll. Am. Ent. Soc. Phila. Type locality, Nevada.

Nevada (Morrison).

Bombomelecta separata var. **maculata** n. var.

Separated from the typical species by the presence of a dot of white appressed pubescence on each side of abdominal segments three and four.

Type, Coll. Am. Ent. Soc. Phila. Type locality, Salt Lake City, Utah, 26, iv, 1896. One ♀, Condon, Oregon, 23, vii, 1899.

Bombomelecta pacifica Cress.

Trans. Am. Ent. Soc., vii, 1879, p. 204, ♀ not ♂.

Bombomelecta thoracica var. *pacifica* Cress, Syn. Hym. N. Am., 1887, p. 298.

Melecta thoracica var. *pacifica* D. T., Cat. Hym., x (Apidæ), p. 318.

Type, Coll. Am. Ent. Soc. Phila. Type locality, California.

♀, California. One ♂ Calif., has the light pubescence almost white. One ♂ Colorado, with light pubescence pale ochraceous. Two ♂'s, Nevada, with light pubescence yellowish ochraceous.

Bombomelecta fulvida Cress.

Trans. Am. Ent. Soc. Phila., vii, 1879, p. 204. ♀.

Melecta thoracica var. *fulvida* Cress., Tr. Am. Ent. Soc., vii, 1879, p. 204. ♀.

Melecta thoracica var. *fulvida* D. T., Cat. Hym., x (Apidæ), p. 318.

Bombomelecta thoracica var. *fulvida* Ckll., Psyche, vii, Suppl., i, p. 11.

Type, Coll. Am. Ent. Soc. Phila. Type locality, Nevada.

Nevada; Mesilla Valley, N. M., on *Lycium* (J. Casad.).

Possibly only a race or variety of *pacifica*, but not related to *thoracica*.

Bombomelecta azygos n. sp.

♂.—Length 14 mm.—*Head* shining and roughened, greater part of tegument hidden by the short black hair. Eyes converging below diverging above. Clypeus with closely arranged ill defined punctures shining, the anterior border with a very narrow polished margin. Labrum almost flat, polished, irregularly punctured, the punctures rather large but not well defined. Ocelli arranged as in *zygos*. Mandibles heavy and short, one mandible overlapping the other extends only half way up. Scape densely covered with black pubescence, hardly longer than the first joint of flagellum; first joint of flagellum nearly as long as next two united.

Thorax; dorsulum punctured, the punctures moderate not sharply defined, close together, the sculpture in greater part hidden by the yellowish ochraceous pubescence. Scutellum rugulose, with a slight eminence on each side, covered with black pubescence. Metathorax with a well defined triangular area, the

sculpture of the triangle much like the surrounding area, rugulose, shining, a median smooth streak in the triangle and the apical half duller than other parts of metathorax. Between the apex of the triangle and the insertion of abdomen is a distinct pit about as broad as long. Metathorax and sides of thorax covered with black pubescence, the sides of the thorax more closely rugulose than the metathorax—dull. Legs covered with black pubescence; claws cleft, the anterior pair of legs with the lesser tooth of claw slender and extending beyond middle of large claw, the middle and posterior pair of legs have the lesser tooth short and broad, without a point, not very prominent. Distance between the insertion of first recurrent nervure and second transverse cubitus on cubitus about one-fourth length of second cubital cell on the cubitus; second recurrent received by the third cubital cell in the middle. Transverse median nervure in hind wings terminates a little before the origin of cubitus.

Abdomen shining, finely sculptured, covered with a fine black or deep brown appressed pubescence, a slight depression on second and third segment with denser pubescence, segments 1, 2 and 3 with narrow polished apical margins, 4, 5, 6 with broad polished margins, a row of bristles on segments 4 and 5 at the caudal edge of polished margin. Apical segment slightly emarginate and with a slight median furrow. First and second segment with a small spot of yellowish appressed pubescence on each side near the caudal margin.

Black, tarsi somewhat inclined to brown. Wings very much darkened, deep brown, nervures black.

Type, Coll. Am. Ent. Soc. Phila. Type locality, Nevada.

Nevada, one ♂.

Bombomelecta alfredi Ckll.

Psyche, vii, Suppl. 1, p. 2, ♂ 12 mm.

Type loaned to Acad. Nat. Sci. Phila. Type locality, Las Cruces, N. M.

One ♂, Las Cruces, April 17, 1895, on cottonwood tree (A. Holt).

Bombomelecta edwardsii Cress.

Trans. Am. Ent. Soc., vii, p. 92, ♂.

Type, Coll. Am. Ent. Soc. Phila. Type locality, California.

One ♂, California. Has spines on scutellum like *zygos*.

NOTES ON SOME GENERA OF BEES.

BY T. D. A. COCKERELL.

A few years ago Mr. J. Vachal sent me a lot of critical comments on Mr. Ashmead's "Classification of the Bees" (TRANS. AM. ENT. SOC., xxvi). At the time, I suggested that he should publish them; but I believe he has not done so, and as many of them are important, I present them here. I add various remarks of my own, but in every instance Mr. Vachal's observations are carefully credited to him. The paper is intended to be supplementary to that of Mr. Ashmead, contributing facts which will have to be considered when a revised classification is prepared.

NOMIOIDES Schenck.

According to Mr. Vachal there is no rima or furrow on the fifth dorsal segment of the female, as in other Halictinæ. However, in a female of *N. variegatus* from Triest, June 8, 1897 (Ducke, com. Friese), it is distinctly present, though lacking the fringe of hairs seen in *Halictus*. In *N. pulchellus* I find the maxillary palpi twice the length of the galea, six jointed, the joints about equal, except the first, which is shorter. The labial palpi have four joints of equal length, or approximately so. The mouth-parts are essentially as in *Halictus*. Mr. Vachal says *Nomioides* is not *Lucasius*, a genus "founded on two aberrant male *Halictus*, of which the females are true *Halictus*." I have *Lucasius*, and it is not at all like *Nomioides*.

DIDONIA Gribodo.

This cannot go in Sphecodinæ. Mr. Vachal writes: "*Didonia*, after the description of Gribodo, is not destitute of pollen-collecting apparatus: 'Pedibus posticis autem ut in Andrenis, flocculo pollinigero trochanterorum magno;' Gribodo put it in Andrenidæ, Latr. = Panurgidæ, Ashm."

CAUPOLICANA Spinola.

Mr. Vachal states that the second and third cubital cells are not equal, the second is much shorter, the first recurrent nervure almost or wholly interstitial with the first transverse cubital nervure. As a matter of fact, *Caupolicana* is quite identical with *Megacilissa*.

More or less green or purple forms, confused with *Megacilissa*, belong to *Ptiloglossa* Smith, which in Ashmead's tables is placed with Andreninæ.

MYDROSOMA Smith.

Ashmead has it *Madrosoma;* Mr. Vachal pointed out the error. This has an obtuse emarginate tongue, and seems to be a genuine Colletid, differing from *Colletes* by its metallic tints. In *Caupolicana* (*C. yarrowi* Cresson) the tongue is short, but deeply divided into two long narrow segments, which are thickly covered with long bristles. The labial palpi are short and thick, the first joint very stout and as long as the next two together, the second and third short and cordate, the fourth swollen-cylindrical, and decidedly longer than the second or third, which are equal to one another. The short six-jointed maxillary palpi have the first joint much the longest, as long as the next three together, 2 to 5 suboval and about equal, 6 long-cylindrical, nearly as long as 4 and 5 together. The galea, though short, is longer than the palpus, and bears long bristles at its end. The teeth of the maxillary comb are extremely long. The form of the maxillary comb, with the lower teeth longer and curved, is quite as in *Colletes*. While *Caupolicana* is not so like *Colletes* as *Mydrosoma* must be, I think there is no question that Ashmead is right in including it with the Colletidæ. The form of the palpi is quite suggestive of *Scolia*.

PROTOXÆA Ckll. and Porter.

This is not related closely to the Colletidæ. Compared with a *Scolia* (? *hæmatodes*) from Las Vegas, N. M., the mouth parts show the greatest possible similarity, so that I must regard *Protoxæa* as derived from the Scoliidæ, or rather both from a common ancestor having a similar mouth. The long first joint of the labial palpi of *Protoxæa* appears to be produced by the chitinisation of the area between the first joint (very short) in *Scolia* and the mentum, that is, of the palpiger. Thus, the labial palpus represents palpiger and the first joint of palpus fused. *Scolia* has a marginal comb on the galea, which is lacking in *Protoxæa*, which has not even the ordinary maxillary comb.

The differences between *Protoxæa* and the Scoliidæ, aside from the mouth-parts, at first sight seem very great, but there are resemblances which should not be overlooked. In particular I find a cer-

tain similarity in the wings, which, though not extending to details, appears to be significant. The coarse punctures on a shining ground, and to some extent the form of the thorax of *Scolia* are indicated in the bee genus *Temnosoma*, though not in *Protoxæa*. The eyes of *Protoxæa* are not emarginate, but they are so in many Halictine bees, while the Myzinid wasps have them so in the male, but not in the female.*

The mouth of *Temnosoma* could be derived from that of the *Scolia-Protoxæa* type by the shortening of the tongue, paraglossæ and first joint of labial palpus; the tongue, as in *Halictus* and *Cilissa*, preserves the peculiar tapering form of *Prctoxæa*. The galea in *Protoxæa* shows no sign of the apical division seen in *Scolia*, but in *Nomia* and *Halictus* it is plainly indicated, and *Nomia* (which Mr. Vachal considers nearer to *Halictus* than to *Andrena*) has also the tapering tongue, broad basally and filiform apically. A very interesting genus is *Meroglossa* Smith, which assuredly does not belong to the Prosopidæ. The arrangement of its tongue and paraglossæ is quite suggestive of *Protoxæa*, but the maxillary palpus is very much longer than in that genus. The venation is quite different.

The present conclusion is, that the whole series of Halictine bees, at any rate, came from an ancestor not far removed from the Scoliidæ. *Protoxæa* is of course not an Halictine, but it is from the same general stock, and apparently nearer to the Scoliids than is *Halictus*. We seem to have divergent rather than successive types, but further study will no doubt make the true relationships much clearer. It may be added that *Myzine* and the Tiphiids have the tongue short and rounded, not in the least as in *Scolia*. The mouth of *Scolia* is in most respects far more like that of *Protoxæa* than it is like that of the Myzinids or Tiphiids, though the latter have the divided galea † of *Scolia*.

I do not think the Colletidæ have any bee-ancestry in common with the Halictines. So far as the mouth-parts go, *Colletes* shows the closest possible resemblance to *Tachytes*, the resemblance extend-

* Allied to the Scoliidæ are the Thynnidæ and *Corynura* Spinola, as Mr. Vachal remarks, was based on a ♀ Thynnid and a ♂ Halictid; a fact indicative of close resemblance.

† Kellogg (Am. Nat., Sept., 1902) calls the part here designated the galea, the maxillary lobe, and says it consists of the galea and lacina fused. So I suppose that the apical part in the Scoliids, etc., is the true galea, and the rest the lacina.

ing to the peculiar form of the tongue, and the comb along the middle of the maxillary blade, The prothorax in *Tachytes* is of course much more bee like than that of *Scolia*, and one has to remark that the eyes in *Tachytes* are extraordinarily similar to those of *Protoxœa*, converging just the same above. The pygidial plate of *Tachytes* is also suggestive of the bees. In *Gorytes* the tongue is very broad and truncate, but not emarginate, and the paraglossæ are broad; the comb of the galea is well developed. *Gorytes* does not stand so near to the bees as *Tachytes*.

The tongue, paraglossæ and labial palpi of the Australian genus *Hyleoides* Smith, as figured by Smith, are almost precisely those of *Odynerus*, even to the spots on the tongue and paraglossæ. I do not know how to explain this; one cannot well believe a bee genus to have been derived from the Eumenidæ, although the colors of *Hyleoides* do rather resemble those of that group. Whether *Prosopis* could be derived from such a type as *Hyleoides*, I do not know, but it seems to me to closely resemble *Colletes* in its mouth, and if *Colletes* is derived from a wasp with a *Tachytes* like mouth, there is no room in the series for such a type as *Hyleoides*. The maxillary blade of *Prosopis* is quite like that of *Colletes*, except that, as in the higher bees, the comb (of about six teeth) is wholly below the palpi; the maxillary palpi are much longer than in *Colletes*. The labial palpi and tongue in the two genera are not essentially different.

It is to be observed that the bifid tongue is doubtless the older type. The Sphecoidea, Eumenidæ and Vespidæ are in this respect more primitive than the Scoliidæ and the majority of the bees. A Braconid examined has a long divided tongue, which would do very well for a Eumenid, but it has not the Eumenid paraglossæ.

PASIPHAË Spinola.

Mr. Vachal remarks that this has a distinct tibial pollen-brush, and cannot go with the Prosopidæ. It appears to be a Colletid with only two submarginal cells.

BIAREOLINA Dufour.

This of course is an *Andrena* with two submarginal cells. Mr. Vachal states that the sixth ventral segment of the ♂ has lateral projecting points as in *Parandrena*. I possess the ♀ only; the abdomen is very strongly and excessively closely punctured; the metathorax suggests *Trachandrena*.

SCRAPTER Lepeletier.

Dalla Torre gives this as a synonym of *Macropis*. Mr. Vachal "*Scrapter* St. F. and Serv. 1825, is not *Scrapter* Lep., 1841, and Ashm.; the latter = *Panurginus* Nyl." He also adds that *Scrapteroides* Gribodo is *Panurginus*. *Scrapter andrenoides* Smith is no doubt an Andrenid with two submarginal cells.

DASYPODA Latreille.

Mr. Vachal remarks that the tip of the marginal cell is acute and contiguous with the margin of the wing. In *D. argentata* var. *braccata* (Rads.) from Deliblat (*Friese*) I find the tip of the marginal cell practically as in *Macropis labiata*. In *D. hirtipes* the same. It diverges from the costa to a minute degree, and is briefly appendiculate.

PSÆNYTHIA Gerstaecker.

Mr. Vachal states that this is nearer to *Camptopœum* and *Calliopsis* than to *Andrena*. That is to say, it is a Panurgine with three submarginal cells. I think *Protandrena* is also related to the Panurgids, but it is really a connecting link between these and the Andrenids, as shown by the short tongue.

ANCYLA Lepeletier.

Mr. Vachal remarks that this is not an Andrenid; he adds: "Dalla Torre was wrong in putting it as a synonym of *Andrena;* but he corrected his mistake at p. 614; at p. 250 he has put *Plistotrichia* Mor. (nec *Pristotrichia* Radoszk , which is the same genus, between *Eucera* and *Meliturga*, where is its true place." Smith placed the genus between *Andrena* and *Nomia*, which no doubt resulted in confusion.

With regard to *Eucera*, I believe it is the European representative of our *Synhalonia*. The resemblance in the ornamentation of the abdomen between the females of *Eucera longicornis* and *Synhalonia frater* is quite remarkable. E. Saunders says the maxillary palpi of *Eucera* are 5-jointed; in *E.* (*macrocera*) *ruficollis* Br. from Algeria (*Vachal*), I find them 6-jointed, counting the thick basal joint, which is easily overlooked. In *Meliturga clavicornis* they are also 6-jointed. *Meliturga* is a peculiar genus, the ♂ with large eyes converging above, quite as in *Protoxœa*. The labial palpi have the first two joints flattened (the first very much the longest), but still not excessively differentiated from the last two, which still remain

nearly in a straight line with them. The tongue is quite as in the long-tongued bees, but only moderately long. The apex of the ♂ abdomen is bispinose, recalling *Oxæa*. The ♂ antennæ are strongly clavate, but those of the ♀ would do very well for an *Andrena*. The marginal cell is obliquely truncate; the first recurrent nervure meets the second transverso-cubital as in *Protoxæa*. The female abdomen looks like that of an *Andrena*. All of this beautifully connects the Anthophorid bees with the Andrenoid and other primitive types, which we concluded to be derived from ancestors allied to the Scoliidæ.

STEGANOMUS Ritsema and **CTENOPLECTRA** Smith.

These do not belong to the Megachilidæ according to their authors, Mr. Vachal remarks. Smith thought *Ctenoplectra* near to *Macropis*, remarking: "The posterior legs have a dense clothing or pollen brush as in that genus." Steganomus was separated by Ritsema on a ♂, "he said that his genus was closely allied to *Nomia*, that is, a *Nomia* with two cubital cells" (Vachal). Smith put *Cyathocera* (= *Steganomus*) in the Andrenidæ near *Nomia*, and said of the ♀ that the posterior legs have the tibiæ and basal joint of the tarsi furnished with a dense scopa. Mr. Vachal thinks Mr. Ashmead was misled by what appears to be a typographical error in the table in Bingham's work on the Hymenoptera of India, whereby these genera appear to go with those having an abdominal scopa. Mr. Vachal adds that the species of *Ctenoplectra* from Africa (*C. antinorii* Gribodo) which he has before him has the three last segments of the abdomen fringed.

EUASPIS Gerstaecker.

Mr. Vachal has the ♀ of the two species of this genus, and says both are without scopa, ventral or tibial, so the genus should go in the Stelidinæ.

ALLODAPE Lepeletier.

Mr. Vachal states that this has a tibial scopa in the ♀; he thinks it belongs next to *Ceratina*.

MACROPIS Panzer

This is not a Panurgid, according to Mr. Vachal; he says it is an isolated genus of uncertain affinities. It appears to me to be a modified Andrenid, but it wholly lacks the lateral facial depressions

of *Andrena*. The mouth-parts do not appear to be essentially different from those of the Andrenids, and many characters of the abdomen, wings, etc., are strongly suggestive of *Andrena*. These remarks are based on the European *M. labiata;* the American *M. ciliata* has an abdomen strongly recalling *Exomalopsis solani*. The American *M. steironematis* Rob., with its densely punctured abdomen, looks very different from *labiata* or *ciliata*, but it has the *Macropis* mouth.

ANTHOCOPA Lepeletier and **CHALICODOMA** Lepeletier.

Mr. Vachal observes that Lepeletier cared more for the habits than the form of bees, for founding generic groups; thus *Anthocopa* (wrongly credited by Ashmead to Latreille) was based on *Osmia papaveris* Latr., which is a petal-cutting bee, thus resembling the leaf-cutting *megachile;* while *Chalicodoma*, a Megachiline, makes mud-mortar cells.

FIORENTINIA Dalla Torre.

As Mr. Vachal says, this was merely a new name for *Epeicharis* Rad., and so cannot differ from it. Ashmead has a separate genus called *Florentina* D. T., apparently intending *Fiorentinia*. The characters given by Ashmead for "*Florentina*" appear to belong to *Fiorentinia*; those given by him for *Epeicharis* Rad. do not belong to that genns, the maxillary palpi being said to be two jointed. Is there not some confusion with *Epicharis* Klug.?

EPICLOPUS Spinola.

This genus ("*Epicolpus*" in Ashmead) is said by Mr. Vachal not to be an Anthophorid, but to be hardly separable from *Melecta*. Its blue color is peculiar. In this connection one may remark on the beautiful and extraordinary patches of bright blue appressed pubescence on the head, thorax, legs and especially abdomen in *Crocisa splendidula* Lep. from Africa, a specimen of which I owe to the kindness of Mr. Vachal. Something of the same sort is seen in Ashmead's Xylocopid genus *Cyanosderes*.

NEW NOCTUIDS FOR 1903, No. 4, WITH NOTES ON CERTAIN DESCRIBED SPECIES.

BY JOHN B. SMITH, SC.D.

The first paper of this series is in the Can. Ent., xxxv, pp. 9–15, and 6 species are there described; the second is in the Journal of the New York Ent. Soc., xi, p. 1–23, and 21 species are there described. In the present paper 34 new names are proposed, and there are critical notes on the species of *Raphia*, *Fishia* and *Acontia*. It was intended to add to this a revision of the species belonging to the Eucalypterid series; but a fire in my laboratory destroyed some of my notes and disarranged the material to such an extent that it will be impossible to do systematic work for some time to come.

Under the circumstances it was deemed best to present the species already in manuscript in this paper.

Notes on the Species of RAPHIA Hbn.

For many years two species of *Raphia* only were in our collections—*abrupta* Grt. and *frater* Grt. Both of these are eastern species, and, while they are undoubtedly distinct, it is not always easy to separate them. *Frater* is common and variable; *abrupta* is rare and its range of variation not yet understood. Quite usually a somewhat obscurely marked *frater* does duty for *abrupta*, of which I have only one pair in my collection at present. The ♀ is from Brazos County, Texas, and the female from Colorado; which does not accord at first blush with the term "eastern species;" nevertheless, the faunal region is really the same.

Abrupta may be most readily distinguished by the dusky secondaries of both sexes, and in this it differs from all the other species. In addition, the ground color is a dull obscure gray as compared with the dark rather clear gray of *frater*. In the ♂, *abrupta* is narrower winged, the outer portion of the wing is paler beyond the t. a. line and above the claviform, the claviform itself is well marked and extends to the t. p. line. In the ♀ these characters are obscure and, except for the dusky secondaries, it would be difficult to to distinguish from *frater*.

Frater has the primaries uniformly gray, and all the maculation is rather evenly relieved, though by no means prominent or contrasting. The specimens before me range from Ontario, Canada, to Winnipeg, Manitoba; south to Denver, Colorado, and east to New Jersey. While there is considerable difference in appearance, there is no variation in the essential characters.

In 1886 Mr. Putman Cramer described *R. coloradensis* as a variety of *frater*, and so it remained until Dr. Dyar in his catalogue of 1902 correctly listed it as a good species. The type of maculation is like *frater* in all essentials; but instead of an even dark gray the primaries are mottled. The ground color is much paler, rather whitish in fact, with a slight tendency to a yellowish suffusion, while the maculation is much more contrasting. In general the base and lower half of the median space are heavily black powdered, while the remainder of the wing is whitish; a blackish patch marking the inception of the median shade on the costa and usually some sort of dusky spot indicating the reniform. There is a tendency to lose the orbicular, while the claviform is well marked. I have one female from Phoenix, Arizona, and the balance of my series is from Colorado, partly of Mr. Bruce's collecting, partly from Prof. Gillette, and partly of the Hulst material. The Arizona example is dated January 11th, the others are not dated, nor have any of them specific localities.

Also in 1886, and only a month or two later than the description of *coloradensis*, Mr. Henry Edwards published *Raphia pallula* from California as a good species, apparently without a knowledge of Mr. Cramer's species. In my list of 1891 I made this a synonym of *coloradensis*, and so it remains in Dr. Dyar's catalogue. I have recently re-examined the types, which are now in the American Museum of Natural History. There are two specimens, both females, and while fully expanded, they suggest cripples; possibly because the primaries are so very broad, and the secondaries are proportionally smaller than in the other species. The yellow suffusion is here in the disc of the primaries involving the upper part of the median space in which the black-filled reniform stands out prominently, while the orbicular is altogether lost. The terminal space is dark, and in this particular it differs from all the *coloradensis* now at hand. The examples are: one from Soda Springs, the other from Siskiyou County, California. I have nothing that agrees with these speci-

mens now before me, and I have had none from other sources. The resemblance to *coloradensis* is marked, and had I received such specimens from Colorado, I would have had no hesitation in placing them as aberrant or discolored examples of that species. Under the circumstances, since there is really nothing to show that the distinctive characters are not permanent, it will be better to restore Mr. Edwards' name to specific standing.

For some time I have had in my collection three examples of another species from Los Angeles County, California, differing from all the others in the very even and very powdery light gray primaries on which the markings are only a little relieved. In the even color it differs from *coloradensis*, and in the very light powdery gray it differs from *frater*. From all the species it differs in the practical absence of the claviform which is barely indicated in only one example. There are other differences in detail which convince me that a good species is under observation, and to this I have applied the name *cinderella*.

Raphia cinderella n. sp.—Very pale ashen gray, powdery; tending toward a yellowish suffusion, the markings blackish, not contrasting. Head with a dark line across the front and another on the vertex. Collar with a dark line across the middle and another at tip. Patagia margined with blackish, and the posterior thoracic vestiture dusky. The disc of the patagia yellowish. Primaries with all the maculation present, darker than the ground, not contrasting and sometimes almost lost in the general gray powdering. The tendency to yellow tinting is mainly in the basal and s. t. space, while the blackish powderings tend to mass along the inner margin. Basal line obscure, usually marked as a dusky spot on the median vein at base. T. a. line geminate, the component parts widely separated, inwardly oblique to the submedian vein, then with a long outcurve to the inner margin near its middle. T. p. line geminate, even, slender, the outer part obscure; rarely evenly and not deeply bi-sinuate, the course as whole parallel to the outer margin. There is a diffuse, irregular, broken median shade, best marked by a dusky spot on the costa, obviously but less distinctly below the submedian. S. t. line whitish, relieved by an irregular preceding dark shade in the s. t. space. A series of blackish terminal lunules. The fringes are dusky, cut with whitish opposite the veins. Orbicular round, moderate in size, consisting of a dusky annulus which may or may not have a central dot in the inclosed area. Reniform varying in size and somewhat in shape, with a dark outline and a dark central lunule which may extend to fill the entire spot. Secondaries white, with a series of blackish terminal lunules, and a blackish spot at the anal angle. Beneath white, powdery; primaries with a vague tendency to reproduce the most obvious markings of the upper side, especially the reniform; secondaries with a small discal lunule. Expands 1.36-1.48 inches = 34 37 mm.

Hab.—Los Angeles County, California, in May.

Three male examples are now before me, two taken by myself and one by Mr. Coquillett. The latter is from National Museum material in which the species is represented by additional specimens. The characters differentiating the species have been already commented upon.

Hadena tonsa Grt., Can. Ent,. xii, 214, 1880.

This species I saw in the British Museum in 1891, and it was at that time unknown to me. Examples came to hand in 1898, but I failed to recognize them and redescribed the species as *Hadenella subjuncta* in the Can. Ent., xxx, 323. A re-examination of the type of *tonsa* in 1890 suggested the above synonymy which was confirmed by a comparison of my material later. Mr. Grote's example came from Nevada; the material at present in my collection is from Washington and Calgary; I believe I have seen examples also from Colorado, but have seen no eastern examples.

In Dr. Dyar's Catalogue, Bull. U. S. Nat. Mus., No. 52, p. 108, *minuscula* Morr. is placed in *Hadenella*, with *subjuncta* as a synonym. *Orthosia minuscula* Morr., referred to *Parastichitis* by Mr. Grote and later to *Hadena* by myself, has absolutely nothing in common with *tonsa* (*subjuncta*); not even wing-form. It does not belong to *Hadenella*, is a medium sized, broad-winged, red brown species, with very simple maculation, and belongs to the fauna of the North Atlantic States. The type is in the Tepper collection, and I have recently seen the species in the Mus. Comp. Zool., from the Thaxter collection.

Hadena exhausta n. sp.—Ground color a pale creamy gray, varying a little toward a brownish shading. Head with a black or brown line across the front, and another on the vertex. Collar with a black or brown transverse median line. Thoracic vestiture brown tipped. Primaries with the broad basal space gray; the median space which narrows greatly toward the inner margin is brownish or blackish, varying in shade but not striking in contrast; the s. t. space is gray, interrupted in the submedian interspace by a black shade line which continues from a black shade connecting the median lines to the outer margin above the hind angle. Terminal space variably dark shaded. Basal line geminate, obvious only across the costal area. T. a. line well removed fron base, geminate; inner line marked on costa and traceable part way across the wing by brown scales; outer line slender, black; included space whitish, or at least paler gray; as a whole the line is obliquely outcurved or almost evenly oblique to the internal vein, reaching the inner margin only a little within the middle. T. p. line geminate, the component lines widely separated, included space whitish or

lighter gray; inner line black or blackish tending to become discontinuous; outer line punctiform, more or less incomplete; as a whole the line is broadly outcurved over the cell, then inwardly oblique to the internal vein where it approaches nearest to the t. a. line. S. t. line somewhat diffuse, smoky, only a little irregular, more or less emphasized by venular dots or shades which sometimes extend toward the outer margin, darkening the terminal shade. A black lunate terminal line. Fringes with a smoky, lunate interline, the margin a little scalloped. Orbicular absorbed in the basal space, the outline of the outer margin forming a little irregularity in the t. a. line. Reniform large, broad, kidney shaped, more or less completely outlined by black scales, within which is a paler annulus; the spot as a whole of the ground color but more or less marked with smoky brown. Claviform short, broad, outlined by black scales, suffused by a blackish or brown shade which crosses the median space above a narrow black connecting line. The internal vein is white through the median space and cuts both median lines, which diverge below it, forming at this point the narrowest portion of the space. Secondaries smoky, glossy, with a vague outer line. Beneath powdery gray; primaries tending to smoky; secondaries with an exterior smoky line and discal dot. Expands .88 inch = 22 mm.

Hab.—New Windsor, N. Y., July 9, 29 (Miss. Emily L. Morton); Schenectady, N. Y. (Lintner).

This species occurs throughout the North Atlantic States, but is not common. It is the species that I have called *hausta* in my own and other collections for years.

My original specimen came to me years ago in such a way that I believed the determination has been made by Mr. Grote, and a hasty reading of the original description which compared the species to *modica* did not raise any doubts as to the correctness of the name. More recently Mr. Merrick sent me from New Brighton, Pa., specimens that seemed closely allied and familiar in appearance; but I could not then recognize the form and sent it back unnamed. In the U. S. Nat. Mus., I again saw the two forms associated in such a way as to bring out the contrasts between them and to make it certain that two species were at hand.

Comparing Mr. Grote's original description carefully, developed the fact that Mr. Merrick's examples are the true *hausta*, while the *hausta* of my collection seems to be an unnamed form. It can be readily recognized by the broad creamy gray basal space, the V shaped darker median space, and the black line extending across the s. t. space in the submedian interspace. In *hausta* the base of the wing is brown and everything beyond the middle is creamy gray. Seen apart, the two species give a very similar impression; seen in comparison their difference is obvious.

Leucania texana Morr., Proc. Bost. Soc. Nat. Hist., xvii, 211, 1874.

Mr. Morrison refers under this name to what he considered a variety of *L. phragmatidicola* from Texas, and gives dates for the specimens. In my recent revision of the species of *Leucania* I quoted the essestial parts of Mr. Morrison's description; but failed to identify it with any form of the species to which it was referred as a variety. It seemed scarcely credible that Mr. Grote's sugges tion as to the species could be correct, especially as he gave the name *ligata* to the form he thought Mr. Morrison might have had before him. In looking over the material in the Cambridge collection recently, I found a small series of specimens labelled *phragmatidicola* var. in Mr. Morrison's handwriting, and three of these examples agree in locality and dates with the facts stated in the description of *texana*. The specimens came from Belfrage, are from the Peabody collection, and without any doubt the specimens Mr. Morrison had before him when he wrote; in other words, they are the types of *Leucania texana* Morr. They prove that Mr. Grote was correct in his surmise, and that *texana* Morr. is really the same as *ligata* Grt. The latter name must sink as a synonym and *texana* must take specific rank in its place.

Leucania flabilis Grt., Can. Ent., xiii, 15, 1881.

This species was described from Long Island, and up to this year I had seen only the typical examples from the Tepper collection. Recently, while looking over the collection of Mr. Philip Laurent, at Mt. Airy, Philadelphia, I was delighted to find a series of eight or more specimens collected at Anglesea, N. J., late in July (21st), and early in August (4th). They were taken at sugar, most of them are females, and all are in very fair condition. None of the specimens are quite as red or quite as well marked as normal *ligata*, though coming from Texas, at least one of the examples would pass as such without question. But, on the other hand, in the four examples now before me there is one that agree perfectly with *L. rimosa* Grt., as represented in an example from Kittery Point, Maine, kindly sent me by Dr. Thaxter. *L. rimosa* was described in the Can. Ent., xiv, 216, 1882, and must be referred as a synonym of *flabilis*. The relation of the latter species to *ligata* yet remains to be determined.

Nelencania prægracilis Grt., Bull. U. S. Geol. Surv., iii, 119, 1877.

Mr. Henshaw has determined that the specimen labelled *Helicphila gracillima*, type in the Cambridge collection is really the type of *prægracilis* and has so recorded it; I have no doubt correctly.

Leucania rufostriga Pack.

On the basis of a comparison made by Mr. Henshaw I omitted this species from *Leucania* in my recent revision and suggested that my *Caradrina punctivena* might be conspecific. I examined Dr. Packard's type myself recently, and found that at least it was not a *Leucania*. It is a horribly faded specimen, and while it is no doubt very close to *C. punctivena*, I am not so certain that it is really the same species. If material could be obtained for comparison from Labrador, it would be an easily settled question.

Mamestra artesta n. sp.—Ground color a grayish red or purple-brown, over a whitish base, giving a peculiar dead appearance. Head concolorous, antennæ whitish. Thorax with tip of collar usually whitish, and with patagia and disc more or less whitish powdered. Primaries with the median lines lost, except on the inner margin; ordinary spots white marked, and the entire wing with a more or less mottled appearance. Basal line white, more or less broken, and sometimes a little emphasized by darker scales. T. a. line very much broken, yet some part of it is visible in each specimen; usually it is a sinuate brown line through a whitish shade on the inner margin and over the submedian vein; sometimes there is a diffuse white line through the cell, and occasionally this extends to the costa T. p. line evenly outcurved over the cell, and a little incurved below; it may consist of a single or a double series of white dots, or of a whitish shade in which a very narrow black zig-zag line appears, and it is always marked in brown on the submedian vein and on inner margin. S. t. line white, more or less contrasting, irregular, broader at anal angle, rarely lost in part. Claviform wanting. Orbicular small, round, usually consisting only of a white annulus, rarely emphasized by an outer ring of darker scales. Reniform upright or a little oblique, moderate in size, broad, centrally constricted, white ringed and with a whitish central line. There is a series of white terminal dots on the veins. Secondaries soiled whitish, veins darker and with a narrow, smoky outer shading. Beneath whitish, a powdering of carmine scales over the costal and apical region, a more or less obvious outer shade band and a dusky discal spot on all wings. Tarsi annulate with white. The entire body tending to purplish, but variable in the direction of a yellowish ground. Expands 1.40-1.76 inches = 35-44 mm.

Hab.—Glenwood Springs, Colorado, in August (Dr. Barnes); Douglas County, Kansas, at electric light, May (Prof. Snow).

Two males and three females in good condition are before me and I have seen other examples, mostly from Colorado. I have an example marked "Pennsylvania," and another marked "Illinois;" but I doubt the correctness of the labels, though I cannot disprove

them and the species may really range east I have heretofore regarded this species as a form of *congermana* Morr., and have so named it in collections. The receipt of additional material proves them distinct. The peculiar, dead, chalky tinge of the primaries is distinctive of the new species, and to this should be added the much more pointed shape of these wings.

Dr. Barnes long since suggested the separation of the Colorado species; but I was unwilling to do so until I had better material of *congermana*. Of the dull yellow shade at the apex and inner angle of Mr. Morrison's species no trace appears in any example of *artesta*.

Trichelea nova n. sp.—Ground color pale grayish luteous, with a variably marked reddish tint. Head and thorax immaculate, save for a variable powdering of black scales which are most obvious on the thoracic disc. Primaries powdered with black or smoky scales irregularly distributed, so as to give the wing a mottled and suffused appearance. The normal maculation is all present, not contrasting, more or less broken and sometimes obscured. Basal line geminate, usually well marked in its entire course. T. a. line geminate, the inner part tending to become vague and obscured; as a whole outwardly oblique, irregularly outcurved in the interspaces. T. p. line geminate, outer portion obscure, inner part lunulate or crenulate, also tending to become lost so as to leave a series of black venular marks emphasized by following white dots; as a whole the line is moderate outcurved over the cell and only a little incurved below it. S. t. line pale, broken, irregular, sometimes emphasized by preceding darker shades and spots, sometimes by dusky cloudings in the terminal space. A series of blackish terminal lunules. Fringes with a dusky interline, cut with white opposite the veins, the margins just a little notched. All the veins more or less obviously dusky, the median vein sometimes quite markedly so. Claviform small, with a variably evident dusky outline. Orbicular small, oval, with a darker outline, a pale annulus within this and a dusky centre; the latter may be lacking, leaving the entire spot a little paler than the ground color. Reniform large, broad, filled with blackish, a little constricted centrally; a pale annulus within a border of blackish scales defines the spot at the sides, the upper and lower margins tending to become obscure. An obscure smoky median shade band is visible below the dark reniform. Secondaries pellucid white at base, becoming smoky toward the margins; more so in the female than in the male. Beneath white, powdery; primaries with veins marked outwardly; a series of blackish venular marks representing the t. p. line; a dark lunule, the reniform spot; while a pale s. t. line is obvious through an outer dusky margin. Secondaries with the veins smoky, a small dark discal spot and a narrow smoky outer border. Expands 1.40-1.52 inches = 35-38 mm.

Hab.—Tucson, Arizona, March 17 (S. T. Kemp); Mesilla Park, New Mexico, March (T. D. A. Cockerell); Phoenix, Arizona, November 10th (Dr. Griffiths); Southern Arizona, April 1-15th (Poling).

Six examples, in fair to good condition, are at hand. The species runs somewhat larger than those heretofore described and is recognizable by the peculiarly mottled appearance and tendency to a reddish tint. In the latter character it approaches *decepta;* in the others it resembles *antica* and *postica* more closely. *Edwardsii* is very distinct from all the others by its uniform tinge on which the maculation is not relieved. *Antica, postica* and *nova* are close allies, but I believe good species. With a series at hand for comparison the differences are marked, and the male genitalia serve to emphasize these differences. These structures were figured for *edwardsii* and *decepta* in the Proc. U. S. Nat. Mus., xii, pl. 22, figs. 18 and 19. Those of the other species referred to are herewith given on pl. iii, figs. 1–12.

Sir George F. Hampson has called my attention to the fact the *Mamestra fuscolutea* is a *Trichoclea* in structure and must be referred to that genus. The fact was verified too late to include the results of genitalic study here.

Tæniocampa columbia Sm., Proc. U. S. Nat. Mus., x, 472, 1887.

This species was described out of the Neumogen collection from specimens taken by Capt. Geddes in 1884. The material was somewhat unsatisfactory, and the generic reference was doubtfully made. In the revision of *Tæniocampid* genera, Proc. U. S. Nat. Mus., xii, 1889, the relationship of the species to *Mamestra* was recognized, but the balance of characters seemed then to point to *Tæniocampa.* Recently, Mr. Dod sent me from Calgary a series of specimens collected in July, whose relationship to *Mamestra meditata* was at once apparent, but the species was marked as distinct. In looking over the collection of the U. S. Nat. Mus., I recognized in the typical example of *T. columbia* the species sent me by Mr. Dod. A study of the genitalia, which were compared with fig. 5, pl. xxiii, Proc. U. S. Nat. Mus., xii, proved the identification correct and makes it necessary to transfer the species to *Mamestra.* It must be *M. columbia* hereafter, and in the arrangement the form must stand next to *meditata.*

The series of twelve examples now before me shows a considerable range of variation; not only in general color, but in the distinctness of the maculation. The normal rusty Tæniocampid brown predominates, and the range is from a decidedly yellowish shading to a very

pretty pinkish tinge; never so dark as in the eastern form. The maculation is sometimes almost washed out; at others the primaries are mottled and all the ordinary spots are clearly traceable. The median lines may be nearly lost, may appear simple, or the t. p. may be crenulated; some forms coming so close to *Tæniocampa rufula* in the markings that a reference there appears most natural on that basis.

Notes on the Species of FISHIA Grt.

The genus *Fishia* was described by Mr. Grote in 1877, Can. Ent., ix, 21, with essential characters as follows:—Tibiæ armed; eyes lashed; antennæ of male brush-like; wing-form like *Mamestra subjuncta;* primaries widening outwardly; thorax with a posterior tuft and the base of the abdomen strongly tufted; fore tibiæ appear to be unarmed; tongue weak. Mr. Grote said further, in comment, that the genus thus combined characters of *Hadena* with those of *Agrotis*, and described *E. enthea* from Oldtown, Maine.

I saw this species in the British Museum collection in 1891, and record it in my catalogue, p. 167, as one I had not previously seen. It impressed me then as related to *Hadena evelina* French, and as a *Hadena* with brush like antennæ. For some years I have had in my collection a species from the Province of New Brunswick doubtfully referred under this name. In 1900 I saw the type again, recognized its dissimilarity to my specimens and noted that the species, though much darker, must be compared with *Aporophyla yosemitæ* Gr.

In 1873 Mr. Grote described *Cucullia yosemitæ* in the Bull. Buff. Soc. Nat. Sci., i, 113, and figured it on pl. iii, f. 3. The specimen was defective, and later, in deference to Dr. Speyer's suggestion, the species was referred to *Aporophyla* Gn. (Bull. Buff. Soc. Nat. Sci., ii, 309). This species does not seem to be in the British Museum, so I could make no direct comparisons.

Of *Aporophyla*, Lederer says (Noct. Eur., 96) that the species have the protuberant bulging front and lashed eyes of *Episema*, but not the plump, bombyciform habitus of that genus; on the contrary, the appearance is hadeniform, as is the maculation and the stout, well developed tongue. Thorax broad, convex, untufted, with smooth vestiture; abdomen without obvious tufts; legs unarmed; antennæ of male either serrated or pectinated.

The type of *A. yosemitæ* is in the Edwards' collection, but I never compared it with the generic characters above given.

Hadena relecina Morr. was described in the Proc. Bost. Soc. Nat. Hist., xvii, 216 1874, and in 1882, Mr. Grote in his list of that year referred the species to *Luceria*. In 1890, in Proc. U. S. Nat. Mus., xii, 440, I identified the species from one female example that agreed very nicely with Mr. Morrison's description, which I quoted. There were some slight discrepancies in what seemed to be immaterial characters and I placed the species in the series *Xylophasia*. Other specimens came to hand which I named *relecina* without further question, until a considerable series seemed to indicate a closer relation to *Aporophyla yosemitæ* than was suspected, and a departure from the original description. Recently, I saw Mr. Morrison's type in the Museum of Comparative Zoology at Cambridge, and find that Mr. Grote was right in referring the species as an ally of *burgessi*, and that through a failure to realize the meaning of Mr. Morrison's term "gray," I had totally misidentified his species. The description of the maculation stands very prettily, and the form of the ordinary spots is almost identical, as are the strongly dentate median lines; but in color and wing-form my *relecina* is totally different from Mr. Morrison's.

This induced a renewed study of my series of specimens, and I find that I have three males and two females that agree with both Mr. Grote's type and with his description; but they agree also with Mr. Grote's characterization of *Fishia*, except that the tongue is not weak. The species is certainly not an *Aporophyla* as Lederer describes it, and would be accepted as *Hadena* on superficial characters without any question. It is really a very close ally of *Anytus* Grt., from which it differs mainly in the more trigonate and more pointed primaries, in the less depressed form and in the finer, somewhat more compact vestiture. As the type of maculation is very different and the habitus distinctive, *Fishia* must stand as an Agrotid genus with middle and hind tibiæ spinose; the hind tibiæ sparsely armed and chiefly between the usual spurs. The thoracic crest is distinct and is divided anteriorly and posteriorly.

Enthea is the type and is described as coal black, with the markings velvety black. This form is not represented in the series before me.

Yosemitæ is dark ashen gray, very even in color, with the lines black and well defined. The secondaries are gray, powdery, whitish at base in the male, darker throughout in the female. The

characteristic maculation on the primaries is: a slender, somewhat curved black basal streak; strongly dentate, single median lines, approaching each other in the submedian interspace and connected by a large claviform, the tip of which actually touches the t. p. line; a series of interspaceal black dashes in which the s. t. line is marked by white dots or scales; a long, narrow, obliquely decumbent orbicular; and a large, outwardly defined reniform. My specimens are from Calgary and from British Columbia. The former are from Mr. Dod, dated September 20th and October 11th; the latter are: 1 from Roundthwaite, the other of Capt. Geddes collecting without definite locality.

Exhilarata is a bright whitish gray species in the male, the maculation of the primaries clearly written, the secondaries purely white. In the female the ground is more fuscous, powdery, the maculation all obscured and smoky rather than black. The secondaries are smoky fuscous throughout. The marked difference between the sexes and the pure white secondaries in the male will distinguish this species from *yosemitæ*. My series consists of three males and four females: Glenwood Springs, Colorado, late September and early October (Dr. Barnes); Pullman, Washington, October 10th to 15th (Prof. Piper).

The new species is characterized as follows:

Fishia exhilarata n. sp.—*Male.*—Pale ashen gray, powdery. Head darker, with a blackish frontal line. Collar with a narrow black line across the middle. Patagia with black submarginal lines. Basal line not obvious. A black basal streak running into the deep outward sinus of the t. a. line. T. a. line single, black, slender, broken, strongly dentate, the tooth in the cell touching the margin of the orbicular, that in the submedian interspace reaching nearly halfway to the inner angle. T. p. line black, single, slender, dentate, more or less broken, most conspicuous in the submedian interspace where it curves inwardly, is preceded by a black shade and followed by a white one. S. t. line white, punctiform, irregular, marked by linear or sagittate preceding and following black shades, forming a diagonal series from the black shade in the submedian interspace to below the apex. Claviform broad, extending across the median space, black margined. Orbicular oblique, oval, a little more whitish than ground. Reniform concolorous, moderate in size, more or less completely outlined in black.

Female.—Maculation as in the male, but everything more obscured, less defined, and the entire ground powdery and fuscous tinged.

Expands 1.40-1.60 inches = 35-40 mm.

Hab.—As stated above.

Pachnobia roosta n. sp.—Ground color rusty red-brown. Head and thorax immaculate; with thin, divergent, hairy vestiture. Primaries whitish powdered over the costal region to the t. p. line, the ordinary markings well written. Basal line single, brown, clearly marked across the whitish costal region. T. a. line brown, preceded by a white shading, outcurved in the interspaces, with strong inward dents on the veins. T. p. line blackish brown, followed by white scales, feebly crenulate, only a little outcurved over cell, somewhat incurved below. S. t. line marked by an irregular s. t. shading against the uniformly paler terminal space. A broken, black terminal line. From the base below median vein runs a narrow yellowish streak broken at the t. a. line, and continued beyond it as a filling to the small, pointed claviform which is diffusely brown bordered. The cell between and before the ordinary spots is deep velvety brown. Orbicular small, irregular, quadrate, white filled, open to the costa, outlined by the deep brown shade elsewhere around it. Reniform narrow, oblong, irregular, a little constricted, oblique, marked by white scales about a central yellow shade, outlined by dark brown scales. Secondaries smoky over a chrome-yellow base, powdery. Beneath smoky powdered over a yellowish base, the costa tinged with carmine. Both wings with a diffuse, smoky outer band and a somewhat lunate discal spot. Expands 1.68 inches = 42 mm.

Hab.—Nushagak, Alaska, August 28, '01, McKay, collector.

One male, in fair condition, from the U. S. National Museum. The antennæ are serrated and bristled, and the species thus belongs with *carnea*, from which it differs in the lack of all gray shadings, in the completely defined median lines, in the white marked differently shaped ordinary spots and in the wing form.

Carneades rumatana n. sp.—Head and thorax luteous gray; head paler in front and with a dark interantennal line; collar with a median and terminal black line, between which a broader brown band crosses the ground; patagia with a black submargin and a white line just behind the collar. Primaries smoky luteous; costal and subcostal veins, but not the costa itself, white to the end of the cell; median vein white; a bright yellow bar from the claviform to the t. p. line; s. t. line indented on veins 3 and 4 only; apex pale. Basal line marked as an inwardly oblique black bordered yellow line in the submedian interspace only. T. a. line geminate, marked by black dots on the costa, obsolete over the costal area, yellowish, with black margins below the median vein; only a little outcurved in the submedian interspace; with a longer outcurve below vein 1. The latter is black, with a narrow yellowish border on each side. T. p. line marked by geminate black spots on the costa, white and abruptly bent over the upper angle of cell, thence a somewhat irregularly lunulate broken black line, a little sinuate, but on the whole, nearly parallel with the outer margin. S. t. line yellow, very distinct, except where it is cut by the pale apical area; very even except on veins 3 and 4, on which it is moderately indented. A lunate black terminal line. A distinct yellow line at the base of the fuscous fringes. The terminal space is evenly dark except at apex. The s. t. space is paler at the t. p. line, but darkens toward the s. t. line except on veins 3, 4, 6 and 7 which are black lined in a whitish shading. The median space is a little darker in the

cell. Claviform black margined, concolorous, extends about half-way across the median space, a bright yellow bar completing the distance. Orbicular small, oval, oblique, narrowly defined by black scales and a white annulus; centre luteous. Reniform upright, oblong or a little lunate, narrow, black edged, white ringed, centre luteous with narrow smoky lines. Secondaries whitish, the veins smoky, a smoky extramedian line, beyond which the wing is more or less smoky, a smoky discal lunule; fringes white. Beneath, primaries smoky gray, except at the margins which are paler. Secondaries a little paler than above, but similar in maculation; fringes white. Expands 1.04–1.28 inches = 26–32 mm.

Hab.—Volga, South Dakota (Truman); Calgary, Alberta, Aug. 23rd (Dod).

Sixteen males and one female, nearly all in very good condition. The species belongs obviously to the *quadridentata* series, but is quite distinct from all the species by the dark margined secondaries, which give it a marked resemblance to some species of *Oncocnemis*. The single example from Mr. Dod, numbered 10, has been in my collection for a long time without a definite place; with the South Dakota material at hand it finds a natural home. It is likely that Mr. Truman had this form mixed with *niveilinea* in which the secondaries are entirely white. The specimens sent me were included in a miscellaneous lot of unspread supposed duplicates and have been but recently brought to light.

Agrotiphila montana Morr., Ann. Lyc. Nat. Hist. N. Y., xi, 95, 1875.

This name was referred by me as a synonym of *A. staudingeri* Moeschl., after comparing Moeschler's typical specimen with the Morrison specimen marked type in the Tepper collection. I have still a photograph made from Moeschler's type; but have not succeeded in securing specimens. In looking through the collection of the Museum of Comparative Zoology recently I found another specimen of *Agrotis montana* Morr., marked "type," which I recognized as belonging to the species described as *rigida* by me. Comparing this example with Mr. Morrison's description, it is evident that it was the one actually used in delineating the characters because it was the better of the two before him. To the courtesy of Prof. Rufus H. Pettit of the Michigan Agricultural College, I owe a sketch of the Tepper type which confirmed my previous conclusions and proved that Mr. Morrison had two distinct species before him when he wrote, but drew his description from one of the examples only. The Cambridge specimen is therefore the real type of Mr. Morrison's name which must be restored to the list, and my *rigida*, Trans. Am. Ent. Soc., xviii, 133, must fall in as a synonym.

A case of this kind is perhaps the most potent argument for having only a single example as an actual "type."

Incidentally, the species standing as *Agrotiphila velata* Strck. in Dr. Dyar's list is wrongly placed. Dr. Strecker described the species as an *Agrophila*, and the name should have been listed under *Spragueia* on p. 215.

MANRUTA n. gen.

Head retracted; front flat; palpi small, thinly clothed with hairy vestiture; eyes small, round; tongue wanting; antennæ of the ♂ lengthily bipectinated, the branches setose; vestiture fine hairy, divergent. Thorax stout, clothed with very dense long woolly vestiture forming no tuftings; legs stout, all the tibiæ spinose; anterior abbreviated, broad, obliquely terminated, inner angle with a long, stout, curved claw, outer angle with a slighter, shorter claw, outer edge with two claws as long and as stout as the one at the angle. Abdomen untufted. Primaries rather short and broad; secondaries rather large, proportionately; venation normal; vein 5 of the secondaries weak and well removed from 4 on the cross-vein.

The characteristic features of this genus are its Bombycoid appearance, emphasized by the woolly vestiture, retracted head, lengthily bipectinated antennæ and lost tongue, combined with the spinose tibiæ and very characteristic armature of the anterior pair.

Manruta elingua n. sp.—Head and thorax white, with a pinkish tinge, which becomes marked on the thoracic disc. Primaries with a pinkish flush over a very pale yellowish base, and mottled with a powdering of black scales. The basal line is geminate, blackish, punctiform. T. a. line single, irregular, diffuse, blackish, broken, with a long outward loop in the submedian interspace which replaces the claviform. T. p. line single, blackish, diffuse, oblique over the costal region, lost over the cell, lunulate below the median vein. S. t. line a series of dusky points in the pale area. S. t. and terminal spaces more or less black powdered. There is a series of vague terminal dots. The fringes are pinkish, cut with white. Orbicular round, white, obscurely outlined by scattered black scales. Reniform not defined; a sort of pinkish, upright constricted line in a whitish cloud. Secondaries whitish at base, becoming smoky at the base of the white fringes. Beneath, primaries faintly yellowish; secondaries white; breast white, woolly; tarsi brown, ringed with whitish. Expands 1.20 inches = 30 mm.

Hab.—Phoenix, Arizona, November 10th and 19th.

Two male specimens collected by the late Dr. Griffiths. Both examples have been papered and are somewhat flattened; one is a

little torn in addition; but the other is in very fair condition. The generic characters will identify the species which may be associated with a small group of heavily built moths surrounding *Thyreion* and *Fala*.

LYTHRODES n. gen.

Head closely applied to the thorax, yet not retracted; front protuberant, the centre depressed, crateriform, this depression medially divided by an acute vertical plate which extends beyond the crater nearly half its diameter; palpi very small, not extending beyond the rim of the shield which forms the lower margin of the head; tongue moderate only and perhaps not functional; eyes moderate in size, hemispherical but not prominent; antennæ simple; vestiture thin, hairy, divergent. Thorax rather small, clothed with thin, hairy vestiture, which forms no tufts; collar and patagia not relieved; legs rather stout, tibiæ unarmed, except for the usual spurs, the tarsi somewhat shortened, with unusually large terminal claws. Abdomen smoothly scaled, untufted. The wings are rather large in proportion to the body; primaries trigonate, costal margin slightly curved, outer margin even, regularly arquate, inner margin sinuate; venation normal; secondaries with vein 5 only a little weaker than the others, from the cross-vein near to its middle.

The characteristic features of the genus are its peculiar frontal structure, the short stout tarsi, otherwise unarmed legs and the sinuate inner margin of the primaries. It may be associated with *Chamaclea* Grt.

Lythrodes radiatus n. sp.—Head and thorax white, with a faint yellowish tinge; abdomen white. Primaries creamy white, with bright almost carmine red streaks as follows: two short apical streaks; two occupying the interspaces between veins 4-5 and 5-6, respectively, for their whole length; one filling the interspace between veins 2 and 4; one extending from base beneath vein 2 to the outer margin; two short basal streaks above and below vein 1. Fringes whitish, cut with black opposite the interspaces. No median lines and no ordinary spots. Secondaries white, with a faint yellowish tinge. Beneath whitish, primaries with the disc a little darker, the markings of the upper side faintly reproduced. Expands .80-.88 of an inch = 20-22 mm.

Hab.—Yuma County, Arizona.

This pretty little species is one of those collected by Mr. Hutson in the Colorado desert, and is represented by two females in good condition. It is altogether unlike any of our other described species, and its only close allies are the species next to be described.

Lythrodes venatus n. sp.—Head and thorax pale, almost creamy yellow; abdomen nearly white. Primaries pale yellowish along the costa and inner margin, else carmineous, with all the veins relieved in pale yellow, the light color expanding somewhat toward the outer margin. Fringes white, cut with blackish opposite the interspaces. There is a whitish, indefined spot in the cell representing the orbicular; but none other of the ordinary markings are present. Secondaries white, with a faint yellowish tinge. Beneath, primaries with disk smoky reddish, the margins yellowish; maculation of the upper side faintly reproduced. Secondaries as above. Expands 1 11 inches = 28 mm.

Hab.—Santa Fé, New Mexico, in July, at light.

One female in rather poor condition from Prof. T. D. A. Cockerell, numbered 3783, and there is a similar specimen from the same source in the collection of the U. S. National Museum. The species is much larger than *radiatus*, and, whereas in the latter, the main color is yellowish and the streaks are red, in *venatus* red is the dominant tint from which the yellow veins stand out in some relief.

Lythrodes discistriga n. sp.—Head and thorax whitish; head with transverse rusty brown frontal and vertexal lines; thorax with a central and two lateral longitudinal rusty brown lines extending from base of collar to base of disc; patagia brown mottled. Primaries whitish, all the veins lined with rusty brown and an additional line through the submedian interspace. In the basal area there is a yellowish shading, and the veins are more heavily marked. At the end of the submedian its branches are shaded with brown in the interspaces, and at the apex the veins are also more heavily marked. Secondaries ocher-yellow, glistening. Beneath, primaries brown on the disc, paler outwardly with the veins relieved; secondaries about as above.

Expands .8-1.00 inch = 20-25 mm.

Hab.—Walter's Station, California, in April; Southern Arizona, April 1-15.

Two male examples; the California example, taken by Mr. Hutson, is nearly perfect and is the smaller; the Arizona specimen is from Mr. Poling and is somewhat defective. Both are from what is practically the same desert area; but the difference in size between examples of the same sex is unusual and a little puzzling. The abdomen is of the same yellow shade as the secondaries, and this, with the maculate thorax and rusty instead of red streaking will easily separate the species from the preceding.

Pseudotamila carminatra n. sp.—Head black, the protuberant front clothed with dense whitish hair. Thorax blackish, with carmine scales and whitish hair intermixed, the collar darker inferiorly, else forming no distinctive maculation. Primaries with a carmine shading over a dull, smoky though pale luteous. The scales are a little metallic or coppery, and the tint changes some-

what according to the angle of vision. The darkest part of the wing is at the base, extending along the costal region to the apex, and then along the fringes to the hind angle; the lightest part is in the cell on each side of the reniform. Basal line smoky, diffuse, from the basal third of costa, a little curved inwardly to reach the inner margin well within its basal third. T. p. line smoky, diffuse, followed by a paler shading, evenly outcurved over the cell and a little incurved below. No. s. t. line. Fringes blackish at base, tipped with white. Orbicular wanting. Reniform large, oval, indefined, smoky. Secondaries black, with whitish fringes. Beneath, primaries with upper half of basal space, a large discal spot, an extra median band and all of terminal space black, else white; secondaries black, with white fringes and sometimes with a narrow white submarginal line; the body parts are clothed with whitish. Expands .60 of an inch = 15 mm.

Hab.—Colorado, 6000 feet.

Two males and two females in good condition. The specimens came to me several years ago from Mr. David Bruce, but were, I think, collected by Mr. Mason. I have neither date nor accurate locality. The species is smaller than its congeners, and easily distinguished by the black secondaries and carmine shaded primaries.

Melicleptria kasloa n. sp.—Head, thorax and abdomen black, with a clothing of thin yellowish or greenish hair that permits the ground color to appear. On the abdomen the vestiture forms fringes at the edges of the segments, giving a ringed appearance. Beneath, on body and legs the vestiture is much more dense, longer, and the whole appears whitish or very pale yellow. Primaries with the basal, s. t., and most of the terminal space olivaceous, with an admixture of black scales. The median space is whitish or pale yellow, with dusky clouds on the costa and inner margin. The median lines are marked only by the contrast between the median space and those on each side of it. T. a. line from costa across the cell about one-fourth from base, then outwardly bent almost to the middle of the wing and incurved to reach the inner margin at about its basal third. T. p. line very evenly and moderately bisinuate. S. t. line yellowish or whitish, sharply limited in the dark s. t. space, somewhat diffuse outwardly; in course it is irregular, and sends in a long dent opposite the cell, constricting and nearly dividing the s. t. space; below that rather evenly bisinuate. Fringes dark, cut with yellowish opposite the interspace. Ordinary spots large, solid, of the dark ground. Orbicular round; reniform broadly kidney shaped. Secondaries black, with a whitish disc, which is very much narrowed by the large black discal spot; there is also a very small yellowish band near the middle of the outer margin. Fringes whitish. Beneath whitish, the lower half of basal, and all of the s. t. space and the large ordinary spots black; secondaries with inner margin, a large discal spot and an abbreviated outer band, black. Expands .96-1.00 inch = 24-25 mm.

Hab.—Kaslo, British Columbia, June 7th and 26th.

Three females, in good condition, from Mr. J. W. Cockle. One of the examples is bred and this is somewhat lighter in color,

appearing as if there was a thin film of whitish over the insect, which disappears after even a brief flight. The species is quite a well marked one and seems to conflict with none other of the genus.

Notes on ACONTIA Ochs.

To the courtesy of Dr. William Barnes I owe a series of specimens from his collection, including also some that were collected by or for Mr. O. C. Poling. This material has enabled me to decide as to the standing of some forms that had been doubtfully set aside, and it added some forms undoubtedly different from anything that I had previously had under observation. The increase in the number of species has been quite unexpected, and indications point to a yet greater number. All the separations made have justified themselves, and the range of variation, though considerable in certain directions, seems to move within tolerably well defined lines.

The exact standing of the species cited by me under *elegantula* Harv. is yet open to question. Of *arizona* and *seminivealis* I have compared the types and their identity is unquestionable. I am not so sure now that *elegantula* is really the same species. A considerable series of the *arizonæ* form is now at hand and shows so much variation that I have been tempted to believe that there was more than one species; but none of this variation runs toward *elegantula* which is clearly separable, though nearly allied in type of maculation. *Elegantula* comes from Nevada, and I have no material from that region for comparison. Under the circumstances *arizonæ* must be restored to rank as a species. As to *semiopaca*, Mr. Grote has himself made this a synonym of *elegantula*. I have no material from the type locality of this species (Montana), therefore cannot speak as to the correctness of the reference; it is a probable one, however, as the faunal region is the same.

Tornacontia altera n. sp.—Head, thorax and abdomen white, immaculate. Primaries white to the middle, save for a gray shading at base; olivaceous gray or brown outwardly. The basal gray shade extends over the costal region, broken by the white basal line to the t. a. line, which is white and defined by the gray shading which extends across the wing over its course. The shadings are not at all prominent and much lighter than the outer parts of the wing. The outer limit to the pale space is formed by the median shade which is olivaceous gray on the costa, a little oblique to the cell in which it is cut by a pale ray that extends to the reniform; below the cell it is defined by a rich brown shade which forms a band of moderate width and fades into a bluish gray. The t. p. line is

incepted by a gray costal spot, followed by a white patch which extends obliquely in to the reniform; over the cell the line is barely traceable, and below that it is lost. S. t. line white, irregular, tending to become broken. Terminal space cut with white on the veins and tending to become white powdered. A broken terminal line of black scales. Fringes long, white, with an olivaceous line at base, and olivaceous spots at apex, above the middle of the margin and at the hind angle. The orbicular is a minute black point. The reniform is round or nearly so, olivaceous gray, partly edged by black scales, white ringed. Secondaries white, becoming smoky at the outer margin; fringes white. Beneath, primaries smoky, the costal and outer margins white; secondaries white, immaculate. Expands .92 inches = 23 mm.

Hab.—Southern Arizona (Poling); Hot Springs, New Mexico, 7000 ft. alt. (Hulst).

One male and one female, both in fair condition. The frontal process in this species is shorter and more obtuse than in the other described species, but is obvious and justifies the reference to this genus, in which it is thus far unique in having the head and thorax white. Superficially it resembles *candefacta* at first sight, differing at once, however, by the white secondaries.

Tornacontia tripartita n. sp —Head deep sable brown. Thorax white, collar brown tipped; the vestiture of the disc is defective in the specimen before me, but apparently the patagia are edged with brown. Primaries white, with a vague bluish tint, the markings bluish gray. The upper half of the wings is chiefly white; the lower half is mostly gray; the space between the median and t. p. line below the cell forming the darkest portion of the wing. All the usual lines obvious. Basal line forming a brown spot on the median vein. T. a. line leaden gray, diffuse, and incomplete over the cell, deeply incurved, black, preceded by a white line from the median vein to the inner margin. The median shade line is marked by a gray costal spot, is lost through the cell, black, parallel to the t. p. line from the median vein to the inner margin. S. t. line marked by a gray s. t. shade which contrasts with the white terminal space; in course only a little irregular. A black, lunate terminal line, narrowly cut on the veins. Orbicular a small round dot. Reniform small, a little irregular, gray, the sides edged with black. Secondaries dull white, with a faint smoky yellowish tint. Beneath, primaries blackish, the margins yellowish, the reniform black; secondaries as above. Expands 1.00 inch = 25 mm.

Hab.—Wilgus, Cochise Co., Arizona.

One female in fair condition, from Dr. Barnes' collection. The species is allied to *megocula*, but is more white, with all the usual markings present, and the reniform small, irregular. The chisel-like projection on the front is broad and well marked. On the secondaries the venation is as in its allies.

Conacontia orba n. sp.—Head and thorax creamy white; vertex and disc a little smoky. Abdomen yellow. Primaries creamy white along the costa

and somewhat less than half the upper portion, interrupted by a narrow band at t. a. line, a broad band at t. p. line over reniform, and by an irregular large blotch before the s. t. line; apex also dusky. The lower half or more is smoky gray to the s. t. line, leaving the hind angle white. Most of the s. t. space is white, except on the costa. The terminal space is mottled with golden brown, and there is a broken black terminal line. The fringes are smoky, twice cut with creamy on the outer margin and creamy at the hind angle. A somewhat obscure band of golden brown scales begins at the dark s. t. spot on costa, curves inward to include the reniform and then downward to the inner margin at its middle T. a. line marked as a gray band over the pale upper half of the wing. T. p. line marked by a broad costal band and then lost until it re-appears as a broken blackish outer edging to the golden brown band. S. t. line marked as a narrow white line between the dark apex and s. t. patch on costa, then lost in the creamy s. t. space. The orbicular is a distinct round gray spot of moderate size just separated from the dusky lower portion of the wing. The reniform is a larger round spot incompletely white ringed and not completely separated from the dusky costal patch just above it, or from the dark inferior portion of the wing. Secondaries an even, pale, glistening smoky yellow. Beneath, primaries yellow. the disc smoky and with a discal spot; secondaries very pale yellow, with darker outer border. Expands .84-1.04 inches = 21-26 mm.

Hab.—Huachuca Mountains, Arizona.

Three females in fair condition, from Dr. Barnes. The species is allied to *angustipennis* in general appearance and type of maculation, but differs obviously in the pale thorax and the distinct orbicular. There are other marked differences, but these are the most apparent and render the new form recognizable at a glance.

Conacontia huachuca n. sp.—Head and collar creamy white, disc of thorax leaden gray; head with an admixture of gray scales on the vertex and on the front. Primaries creamy white along the costal region nearly to the s. t. line and embracing all above the median vein. Along the inner margin, starting not quite at base, and extending to the s. t. line, is a deep gray shading, very jagged at its upper margin, nearly or altogether cut by an obtuse extension of the white shade at its middle; indented or quite crossed by a narrow pale thread at the place of the t. a. line, and by another, even more irregular beyond the t. p. line. There is an apical gray patch, through which the s. t. line is obvious, and a series of three patches along the outer margin, which also extend over the fringes. The median lines are traceable through the pale region of the wing as lemon-yellow lines. Orbicular wanting. Reniform a small yellow dot encircled by the vaguest kind of a yellow annulus. There is a series of black terminal lunules, or a broken black terminal line. Secondaries white, with a faint yellowish tinge. Beneath, primaries distinctly yellowish, with maculation of upper side feebly reproduced; secondaries white. Expands 1.08 1.12 inches = 27-28 mm.

Hab.—Huachuca Mts., Arizona (Dr. Barnes).

Five specimens, all males. Allied to *flavicosta* and with the same

general type of maculation; but the secondaries are nearly white instead of smoky; the primaries are whiter, and have the dark area along the inner margin broken and irregular; the thoracic disc is leaden gray instead of brown, and, finally, the frontal process of the head is umbilicate or navel shaped, with an obvious rim surrounding the roughened protuberant centre.

Acontia alessandra n. sp.—Head and thorax white; front protuberant, with a gray transverse band. Abdomen yellowish. Primaries white from base to beyond middle, interrupted on the costa by an oblong, smoky gray patch at the normal inception point of the t. a. line. At the inception point of the t. p. line another oblong bar separates off a quadrate white spot which extends to the s. t. line. Outer portion of wing olivaceous gray, mottled with black and brown scales. In this dusky area there are traces of a dentate black t. p. line and of a very irregular and incomplete pale s. t. line; but all is broken and obscured. There is a black, interrupted terminal line and the fringes have a blackish cloud opposite the cell and at inner angle. Orbicular wanting. Reniform nearly round, blackish, absorbed in the edge of the dusky outer portion of the wing. Secondaries white, yellowish tinged along the outer margin. Beneath, pale yellowish, with the maculation of upper surface faintly reproduced on the primaries. Expands .76-.98 inches = 19-22 mm.

Hab.—Stockton, Utah, in October (Franck); Huachuca Mts., Arizona (Barnes); Shovel Mt., April and July, Kerrville, and Black Jack Springs, Texas (Coll. div.).

Six specimens representing both sexes in good or fair condition. The species belongs to that series in which a quadrate white spot is separated on the costal region before the apex. It is allied to *quadriplaga*, but is white at the base and to or beyond the middle. There appears to be no obvious difference between the sexes and there is no species with which it is liable to be confused.

Acontia disconnecta n. sp.—Head and thorax gray; collar more or less broadly white; disc with metallic scales. Primaries white above the median vein and along costa to the s. t. line. A dark, brown gray shading from base below median vein to the t. p. line, deeply indented or entirely cut by a white tooth from the middle of the median space. The apex is brown, and from this an oblique shading of olivaceous, gray and metallic scales extends toward the dark area along the inner margin without, in any case before me, quite bridging the gap. The area about the hind angle white. There is a broken black terminal line, and the fringes are largely leaden gray. S. t. line very incomplete, white, variably marked by dusky shadings from the costa to the middle of the wing, thence lost. Orbicular wanting. Reniform vaguely marked in one specimen only. Secondaries white, with a faint yellowish tinge, and with a narrow smoky outer edging. Beneath, primaries yellowish, the maculation of the upper surface faintly reproduced; secondaries white or nearly so. Expands .94-1.04 inches = 24-26 mm.

Hab.—Huachuca Mts., Arizona (Dr. Barnes).

Four males in good condition. This species bears an aggravating resemblance to *Conacontia huachuca;* but while the front of the head is prominent and somewhat inflated, there is no umbilication and no projecting rim. There can be no question of a sexual difference, because all the examples of both species are males. Within the genus to which I have referred it, the nearly ally is *major*, which is much larger and has decidedly yellowish secondaries.

Acontia huita n. sp.—Head and thorax white; head with a protuberant front; sometimes almost tuberculate. Primaries white to the middle, and the white continues along the costal region to the s. t. line, broken only by a yellowish or gray costal spot at almost the middle of the costal margin. A leaden gray area begins at the middle of the inner margin, reaches nearly to the inner angle and narrows a little toward the median vein on which it is obtusely rounded, leaving the round, leaden gray reniform free. A yellow shade extends into the cell before the reniform, and may or may not connect with the gray patch on the costa. The terminal space is dusky, gray or yellowish from the apex to the middle of the outer margin, and in some specimens it continues almost to the hind angle and invades the s. t. space, indicating an irregular, broken s. t. line. There is a white terminal line before a series of black interspaceal marks. The fringes are gray at base, tipped with white. Orbicular wanting. Reniform round, leaden gray, white ringed or entirely surrounded by white. Secondaries blackish tinged, paler basally, the fringes white. Beneath, primaries blackish, with a yellow tinge along the costa, secondaries white. Expands .60 .80 inches = 15-20 mm.

Hab—Kerrville, Texas, Huachuca Mts., Arizona, in April (Dr. Barnes); Southern Arizona (Mr. Poling).

Three males and five females, all in good condition. The species is similar to *binocula* in general appearance, but is smaller throughout. The secondaries have a blackish tinge and the terminal area is more evenly gray. In *binocula* there is a continuous band from the broad gray area which rests on the inner margin to the apex, which partly envelopes the reniform, but leaves the terminal area free. In *huita* this large gray area is not continuous and is completed below the reniform. The gray shading extends from the apex along the outer margin, and if the two shadings are at all connected it is by yellowish shadings. There is also a resemblance to *candefacta*, especially as the dusky secondaries of that species offer a similarity; but here the absence of all gray markings in the basal area, joined to the separation of the gray shadings, affords a distinctive character.

Euclidia dyari n. sp.

This is a new name to designate the species which Dr. Dyar mistook for *intercalaris* Grt., when, in 1898, he determined that there were two allied species. Mr. Grote's description is peculiarly indefinite and applies with almost equal force to two forms with practically the same pattern of maculation. I had never seen the two together and may have put the same name on both at different times.

Apparently Dr. Dyar accepted the specimen labelled *intercalaris* in the U. S. National Museum as the true species, and described as *diagonalis* the form differing from it. Prof. F. H. Snow recently sent me, among other material for determination, a specimen of the supposed *intercalaris*, and, as he collected the material for the original species, I returned the example unnamed, with the request that he compare it with his type material. This he did, and was good enough to send me one of the two typical specimens from the Museum of the University of Kansas. This proves to be *diagonalis* Dyar, which is therefore a synonym of *intercalaris* Grt., and leaves an unnamed form. *Dyari* is that form of *Euclidia* in which a broad pale band curves upward from the hind angle to connect with the equally pale reniform. *Intercalaris* is that form in which the bar from the hind angle is oblique and reaches the median vein well beyond the reniform. The synonymy stands:

E. intercalaris Grt.
diagonalis Dyar.

E. dyari Sm.
intercalaris ‡ Dyar.

Isogona reniformis n. sp.—Ground color a very pale gray, with a yellowish admixture, tending to ashen. Head and collar rusty yellow-brown. Thoracic disc like primaries. Primaries with all the veins pale through the dark markings of the wing; reniform and most of the s. t. space contrasting deep bronze-brown. Basal line indicated by scattered blackish scales. T. a. line single, deep brown, broken, marked by a triangular spot on costa, variably evident below that. T. p. line, single, brown, linear, broadly broken on each vein, rather squarely exserted over the cell and a little incurved below. S. t. line of the ground color, narrow, well marked, irregularly sinuate, dislocated on veins 5 and 6, emphasized by a preceding dark shade and a much narrower following one. A series of black terminal lunules, and a yellow line at base of fringes. Orbicular a deep brown round dot or spot of variable size, and it may be altogether wanting. Reniform large, brown, with a little curve, narrowly bordered with pale scales. Secondaries ranging from yellowish to smoky, the outer margin a little darker, a discal lunule obvious in some specimens. Beneath, very pale yellowish; primaries with a discal cloud. Expands .80-.92 inches = 20-23 mm.

Hab.—Hackley, Texas, in April.

Three male and two female examples in poor condition, through Mr. George Franck. As compared with *natatrix* (*tenuis*) this is much smaller, with shorter, more trigonate primaries, in which the outer margin is not obviously angulated. The palpi are also shorter and the markings are quite characteristic. The species seems to be locally common, and specimens are in several collections as *tenuis*—through my fault.

Yrias albiciliatus n. sp.—Head and thorax pale pink; like a pink flush over a white base. Primaries ranging from pink at base to brick-red in the terminal space; outer half of basal space and all of the s. t. space leaden gray; altogether a very pretty species, with well defined contrasts and markings. Basal line geminate, gray, included space brick red, forming the inner limit of the gray fascia that extends to the t. a. line. The latter is geminate, inner defining line blackish, outer line narrow and brown, included space brick red; as a whole outwardly oblique and only a little irregular. T. p. line geminate, inner line very narrow, gray, outer line darker, merging into the dark s. t. space, included shade brick red; as a whole the line is squarely exserted over the cell and nearly straight from below the reniform to the inner margin. S. t. line irregularly and deeply sinuate, at two points almost touching the outer margin, defined by the difference in color between the leaden gray s. t. and brick red terminal spaces. On each side of this leaden gray band there are white dots on the veins. There is a festooned terminal line, beyond which, on the incurves, are red lunules, and on the outcurves blackish gray spots at the base of the very long whitish fringes. A quadrate gray blotch at the middle of the costa indicates the beginning of a median shade which is marked only by a few gray scales to vein 1, below which it is distinct to the margin. The orbicular is wanting in the specimen. Reniform indicated by a few gray scales forming a very fragmentary outline. The pale pink of the median space becomes brick red in the square exsertion of the t. p. line. Secondaries whitish at base, leaden gray beyond the middle, the inner margin of the dark area irregular. Fringes long and white. Beneath, wings white at base, with a broad blackish outer band; fringes white. Expands .84 of an inch = 21 mm.

Hab.—Yuma County, Arizona (Hutson).

A beautiful little species, represented by one very good female specimen. The species is not really an *Yrias*, but it resembles that genus in general form, and may remain here until further material makes a better reference possible.

Yrias strigalis n. sp.—Ground color a smoky yellowish brown, with an admixture of metallic bluish gray scales. Head darker, seal-brown. Collar intermediate in color between the head and thorax, which is of the same color as the primaries. Wings transversely strigate by alternate rows of smoky and gray scales over which the maculation is obscurely writen in smoky brown. Primaries without contrasts; a blackish apical spot, outwardly defined by a yellow

line, is the most conspicuous feature. Basal line geminate, irregular, as a whole upright or even a little oblique inwardly; the included shade yellowish, outer defining line most obvious, diffuse. T. p. line geminate, inner line lunulate, included space yellowish; a diffuse shading over the entire line breaks up this included space into yellowish lunules; in course the line is evenly outcurved over the cell and a little incurved below it. Median line geminate, smoky, included space paler, curved over the reniform and as a whole intermediate in course between the ordinary lines. S. t. line yellowish, incurved in the interspaces, outwardly toothed on the veins, preceded by a smoky shade line. Outer margin indented on the veins, rounded over the interspaces. A smoky terminal line follows the margin, and running in a little on the veins meets the teeth from the s. t. line, the terminal space being thus divided into a series of smoky circles. The tendency is to a somewhat darker, more bluish tinge in the s. t. space; but this is not a prominent or even a constant feature. Orbicular a smoky, round spot of moderate size in a yellowish areole. Reniform a large, irregular, indefined smoky blotch, followed by a yellowish shading. Secondaries with the maculation bands and lines of the primaries continued across them, but somewhat less obviously. The terminal space is broader and the division is into ovals rather than circles. There is no discal spot. The fringes are long, follow the outer margin and are narrowly cut with pale opposite the veins. Beneath, yellowish to dark smoky, primaries with a smoky extra median line followed by a dark shade. Secondaries with a dusky median band and an irregular s. t. shade, diffuse inwardly, outwardly more or less defined by a yellowish shading. Expands 1.08-1.16 inches = 27-29 mm.

Hab.—Arizona.

One male and two females from the Graef, Hulst and Neumoegen collections, respectively. The species resembles *clientis* in size and in the apical blackish spot. It is narrower winged, however, with less produced apices of primaries, and is much paler, more powdery, with more diffuse maculation. The marking of the terminal space is characteristic in the new species, though indications of it may be made out in *clientis*.

Bomolocha atomaria n. sp.—Head and thorax dusty gray-brown, immaculate. Primaries gray, shaded and powdered with smoky brown, without contrasting maculation. From the base to the t. p. line the color is rather evenly smoky brown, except sometimes along costa where it may be gray. T. a. line a vaguely deeper brown shade, more or less obviously outbent about the middle. T. p. line a narrow brown band, almost even in course, without teeth or angulations. Beyond this line is the palest part of the wing, shading gradually to the s. t. line, which consists of a series of small, blackish dots followed by pale scales; in course it is about parallel with the outer margin. Terminal space paler beyond the s. t. line, darkening to the ground before the margin, except that the apex is left pale. There is a narrow, chestnut brown terminal line, and the fringes are dark. No trace of ordinary spots. Secondaries dusty yellowish gray, the fringes darker. Beneath powdery; primaries smoky. Expands 1.12-1.20 inches = 28-30 mm.

Hab.—Volga, South Dakota.

Four male examples in good or fair condition, from the late Judge P. C. Truman. The species is most nearly allied to *deceptalis*, but is slighter and very much lighter in color. The palpi are longer than is usual in the males of this genus, and in that feature resemble *Lomanaltes*. But they are straightly projected, and the wing form is that which is normal in *Bomolocha*.

Scolecocampa atriluna n. sp.—Ground color of head, thorax and primaries an even, soft, creamy clay yellow. Palpi brown at the sides, else head and thorax immaculate. Primaries with a round black spot at the base of the cell; a small, punctiform dot at the place of the orbicular, and a prominent lunate reniform at the end of the cell. A small blackish costal spot indicates the inception of the t. p. line, and a small brownish line on the inner margin suggests its end. There is a series of small terminal blackish dots at the ends of the veins. Secondaries more yellowish at base, with a broad, smoky outer margin and a moderate, smoky discal spot. Beneath, more ocher yellow, with an extra median diffuse powdery blackish band, less obvious on secondaries, and a distinct blackish discal spot. Expands 1.40 inches = 35 mm.

Hab.—Huachuca Mts., Arizona.

A single female from Dr. Barnes. The species is amply distinct from the common form by the very even coloring of the primaries, which lack all powdering, and by the very distinct sharply defined black reniform. It is quite probable that further material will show that the t. p. line may become complete.

EUCALYPTRA Morr.

1875, Morr., Ann. Lyc. Nat. Hist. N. Y., xi, 104.

Head moderate in size, closely applied to the head, but hardly retracted; front full, hardly protuberant, smooth; eyes naked, large, hemispherical, not protuberant; tongue weak, not functional, of moderate length or very short; palpi long, oblique, with long scales on the second joint, directed downward and giving it a compressed appearance, terminal joint moderate, slightly drooping; forming with a pointed frontal tuft a snout-like appearance; antennæ in the ♂ with the joints long, with long lateral bristles and small tufts of shorter hair, the anterior angles somewhat marked. The thorax is small, only a little convex; vestiture scaly, forming no tufts, collar and patagia marked but not relieved; legs of moderate length, rather stout, unarmed, save for the usual spurs. Abdomen long and stout, reaching to or exceeding the anal angle of the secondaries,

untufted. Primaries moderate or rather large, varying somewhat in width, costal and inner margin shouldered, then subparallel or gently curved, apex rectangular, hind angle obtusely rounded; venation normal, veins 7, 8 and 9 on one stalk out of the end of the accessory cell; 7 branches at less than one-quarter the distance to the margin, 8 and 9 diverge at about one half way between cell and apex. Secondaries proportionate, vein 5 as strong as the others, out of the weak cross vein at about one third the width of the cell.

The species are very similar in appearance and type of maculation. The primaries have no transverse maculation, except a punctiform or fasciform t. p. line; there is a tendency to form a longitudinal shading through the middle, usually accompanied by the loss of the transverse marking; the ordinary spots are reduced to small dots and one or both may be entirely wanting. In color the range is from snowy white through creamy yellow to smoky brown or blackish.

Stygialis is the largest and darkest form, the color being a uniform smoky blackish on both wings, the maculation a black, diffuse streak through the centre of the primaries. The species is from Southern Arizona, and has an unusual admixture of flat hair in the thoracic vestiture, as well as a better developed tongue than the other species.

Strigata has the same longitudinal maculation, but is creamy white in color, with smoky powdering. The tongue is here decidedly weak, but is longer in the female than it is in the male.

Bipuncta is a broad winged species, almost as large as *stygialis*, and the only one in which there is a complete band at the place of the t. p. line; this band varies much in distinctness, but seems to be always present and is often well marked. In color the primaries range from creamy to smoky gray, the difference being mostly due to the variable number of smoky atoms powdered over the light base.

Obscura Grt. belongs here and differs in its somewhat larger size, much darker color and less obvious t. p. line.

Nivealis has the wing form of the preceding; but the primaries are white, immaculate, except for a gray dot on the cross vein at the end of the cell.

Humeralis is narrower winged, with the shoulder of costa and inner margin of primaries well marked. The color is creamy yellow, powdery, and tends to become brown or smoky at the outer

margin, the fringes being usually darker than the rest of the wing. The t. p. line is punctiform in this species, usually traceable, and there may be a fairly obvious longitudinal dusky shading through the middle of the wing.

Umbonata has the wing form of the preceding, but the primaries are uniformly smoky brown, and the secondaries are not much lighter. The discal dots are traceable in most specimens, and in one example there is an indicated t. p. line; but all maculation may be completely absent.

Apicalis is similar to *humeralis* at first sight; but the primaries are decidedly more pointed, the color is more even, there is no darkening outwardly and no t. p. line or longitudinal shading on any specimen.

Minorata is the smallest of the species; like *apicalis* in wing form but darker, with an exterior line almost as continuous as that in *bipuncta*, and in the type specimen a very decided indication of a t. a. line.

1. Primaries with an obvious longitudinal dark streak through the middle of the wing, and no transverse line.....2.
   Primaries with a complete band at the place of the t. p. line, and no longitutinal streak.....3.
   Primaries with t. p. line punctiform or altogether wanting; longitudinal streak absent or only indicated .....4.
2. Color deep smoky brown, primaries trigonate, inner margin not much shouldered .....**stygialis.**
   Color creamy white, powdery; primaries more parallel, inner margin distinctly shouldered.....**strigata.**
3. Size large (25 mm. or more), broad winged, with rectangular apices. **bipuncta.**
   Size small (less than 20 mm.), narrow winged, with pointed apices. **minorata.**
4. Primaries white, without powdering, immaculate, except for a gray discal spot .....**nivealis.**
   Primaries whitish, powdery, without a t. p. line; shoulder of inner margin small; apex pointed.....**apicalis.**
   Primaries yellowish, powdery; punctiform t. p. line usually obvious; shoulder of inner margin well marked; apex rectangular.....**humeralis.**
   Primaries smoky brown, practically immaculate, wing form as before. **umbonata.**

Eucalyptra stygialis n. sp.—Ground color a very deep smoky gray or brownish. Primaries slightly lustrous, powdered with black; a diffuse, black but not contrasting longitudinal shade through the centre of the wing. The black discal dots are traceable. The fringes are a little darker than the rest of

the wing. Secondaries a little lighter in tint than the primaries, immaculate. Beneath paler, smoky gray, powdery, else entirely immaculate. Expands 1,36 inches = 34 mm.

Hab.—Southern Arizona, Poling.

One male example in good condition, received from Dr. Barnes. The chief differential characters of this species have been already mentioned. Its relationship to the others of this genus is obvious, and in wing form it most nearly resembles *bipuncta.*

Eucalyptra nivealis n. sp.—Front of the head, palpi and anterior legs rusty brown or paler. Head above, thoracic disc, base of abdomen and primaries white, slightly lustrous, and in some points of view with a slightly yellowish tinge. Primaries with a very narrow, broken brownish terminal line, which may be wanting. Discal dots very small or wanting. A faint brownish tinge along the median vein. Secondaries smoky yellowish, immaculate. Beneath, primaries smoky; secondaries yellowish, smoky along the costal margin. Expands 1.08-1.16 inches = 27-29 mm.

Hab.—Hastings, Florida (Barnes); Iowa City, Iowa, June 23 (Wickham).

Two good males very similar in appearance, despite the widely separated localities. The Iowa City example came from the Kemp collection, and is dated in 1898. The tongue is very weak and short; the wing form is essestially as in *bipuncta*, but there is a more obvious shoulder on the inner margin. The species should be easily known by the white primaries which are free from powderings.

Eucalyptra humeralis n. sp.—Ground color yellowish, varying in tint and variably black or brown speckled. Front of the head, palpi and anterior legs seal brown. Primaries tending to darken outwardly, fringes usually darker than the rest of the wing. Most of the specimens with a fairly obvious punctiform t. p. line, and in some specimens a darker shading below the median vein indicating a longitudinal shade. A series of brown or blackish terminal lunules. Discal spots black, punctiform, the orbicular tending to become the larger and more prominent. Secondaries smoky, with a yellowish tint, fringes tending to blackish. Beneath, primaries very dark smoky, often with the discal dots of the upper surface reproduced; secondaries usually paler, except along the costa. Expands .80 1.20 inches = 20-30 mm.

Hab.—North Carolina, in August; Hastings, Florida, in April, June, September and October.

Thirty males and two females are before me, most of them in good condition. The Hastings specimens come, in part, from Dr. Barnes, in part from Mr. Kearfott, and in part from Mr. Franck.

This is the most stumpy-winged species of the series; the primaries being broad and short, with a distinct shoulder on the inner

margin. It is also rather more deeply yellow in ground color than the other species, and owes the outward darkening less to a denser powdering than to a deepening of the actual tint. The tongue is very weak, and in some examples also very short; but that seems a variable quantity.

In one example the longitudinal streaking is sufficiently well marked to suggest *strigata*, but the much broader wing, the distinct t. p. line and the very dark under side serve as distinctive characters. It seems that, in this species, the stumpiest wings are best marked, and that all the markings intensify in similar proportion.

Eucalyptra umbonata n. sp.—Head, thorax and primaries a deep chocolate brown, somewhat lustrous. Primaries with a series of darker terminal lunules. In some specimens a punctiform t. p. line is indicated. Discal spots punctiform, black, usually present, and in one example the reniform is geminate. Secondaries a paler, more smoky brown, palest at base. Beneath, dull chocolate brown, powdery, immaculate. Expands 1.00–1.16 inches = 25–29 mm.

Hab.—Hastings, Florida, April (Kearfott) and June (Barnes).

This has the general wing form of *humeralis*, but is easily distinct by its uniform chocolate brown color, which is not due to a powdering or an overlay upon a lighter base. The tongue is weak and only moderate in length. I have eight examples, all of them males.

Eucalyptra apicalis n. sp.—Front of head, palpi and anterior legs brown. Head above, thorax and primaries whitish, with fine black powderings. Primaries with a punctiform terminal line and punctiform discal spots, else immaculate. Secondaries creamy white or yellowish to smoky gray, immaculate. Beneath, smoky gray or brownish, more or less powdery. Expands .80–1.00 inches = 20–25 mm.

Hab.—Hastings, Florida, June 8th to 20th (Barnes); September 21st to October 6th (Kearfott).

Six ♂ and four ♀ examples, varying only in the apparent coloration. The June specimens are as a whole more gray than those dated September and October, and they are also the larger. Otherwise there seems no difference, and in none is there any appearance of a transverse or longitudinal line or shade. The tongue is much reduced, and in some exemples seems almost wanting at first sight. The character of the wing form has been already discussed.

Eucalyptra minorata n. sp.—Ground color whitish, so densely powdered with black as to seem gray. Palpi, head beneath and anterior legs brown. Primaries with a heavier powdering to form an evenly curved very obscure t. a. line over the punctiform orbicular. T. p. line continuous, single, fasciform, bent

over the cell and rigidly oblique from the angle to the hind margin. A lunuate terminal line. Discal spots black, punctiform. Secondaries smoky gray, with a darker terminal line; else immaculate. Beneath, smoky brown, powdery; secondaries with a blackish discal lunule. Expands .76 inches = 19 mm.

Hab.—Hastings, Florida, October 4th.

One male specimen in rather poor condition, from Mr. W. D. Kearfott. This is the smallest species of the genus, and it is unfortunate that there should be one example only. The traceable t. a. line of the primaries above and the dusky lunule of the secondaries below should make the species recognizable. The tongue is moderate in length but weak.

ARETYPA n. gen.

Head rather small, closely applied to the thorax, yet not retracted; eyes naked, hemispherical, somewhat protuberant; front full, smooth; palpi oblique, exceeding the head by more than its own length, basal joint moderate, rather slender, second joint transversely flattened at tip, vestiture directed forward and downward, terminal joint a little drooping; antenna of male lengthily bipectinated, the branches ciliated, each branch with a curved bristle at the inner side of the tip; tongue spiral, moderate in length and apparently functional. Thorax moderate, subglobose, vestiture composed of flattened hair forming no tufts; collar and patagia not relieved; legs long and slender, closely scaled, with the usual spurs long, but otherwise unarmed. Primaries trigonate, proportionately large, apex a little pointed; venation normal, veins 7 and 9 from the end of the accessory cell 8 out of 9 half way to the apex. On the secondaries vein 5 is weaker than the others, though fairly well developed, and is from the cross vein about one-third across the cell.

This genus differs from *Eucalyptra* in the lengthily pectinated antenna of the male, in the slender, longer legs, and in the differing form of the primaries which have the outer margin a little excavated below the apex. These points were noted in my description of the species referred here; but I thought at that time that it might remain associated with *bipuncta;* the occurrence of so many other species, all closely allied would leave *pectinicornis* as an abnormity and it is therefore separated as the type of the present genus.

Amolita obliqua n. sp.—Head and thorax creamy yellow, with a pinkish flush, immaculate. Primaries with a more or less obvious reddish flush over a pale yellowish base, an admixture of brown and blackish scales giving the wings

a vague powdery appearance. A dusky brownish shade band extends rigidly from the inner margin, about two-fifths from base, to the apex. A second, narrower and less obvious but similar band extends from the inner margin two-thirds from base and curves gently outward to the apex where it meets the rigid band. There is a series of black terminal dots and a pale line is at the base of the fringes. The orbicular is a minute black point. The reniform is indicated by a somewhat larger dot in some specimens, but may be entirely absent. Secondaries a pale glistening yellowish white, immaculate. Beneath, somewhat ocherous, powdered with darker scales; secondaries with a small discal spot. Expands .80-1.00 inch = 20-25 mm.

Hab.—Hastings, Florida, April, September 20th to October 21st.

A series of 16 males and 2 females from Mr. W. D. Kearfott are readily distinguished from *fessa* by the rigid inner shade band, which runs direct from apex to inner margin and does not curve downward along the median vein. There is in some specimens a dusky shading along the median vein or in the cell, but it is indefined and does not join the definite band. One of the two females is larger than any of the males, and it is probable that this difference in size will prove to be the rule.

Amolita roseola n. sp.—Head and thorax dull white, with an admixture of reddish scales that gives a faint rosy tinge, else immaculate. Primaries yellowish white, with a sufficient admixture of red scales to give a very decided rosy tinge, through which the veins are traceable in the ground color; an admixture of darker scales gives the wing a somewhat powdery appearance. A somewhat indefinite deeper shading runs from base through the cell to the apex, and another of the same kind from base through the submedian interspace, curving toward the apex from about the middle of the wing. The orbicular is indicated by a small black dot, and the reniform by a pair of such dots. There is a powdering of blackish scales in the submedian interspace, which may form a black mark near base and a short spur near the middle of the space. The terminal spots are black and linear; really a broken terminal line. Secondaries whitish, glistening, with a vague wash of yellow and pink. Beneath, red along the costa only, fading toward the interior. Expands .60-.80 inches = 17-20 mm.

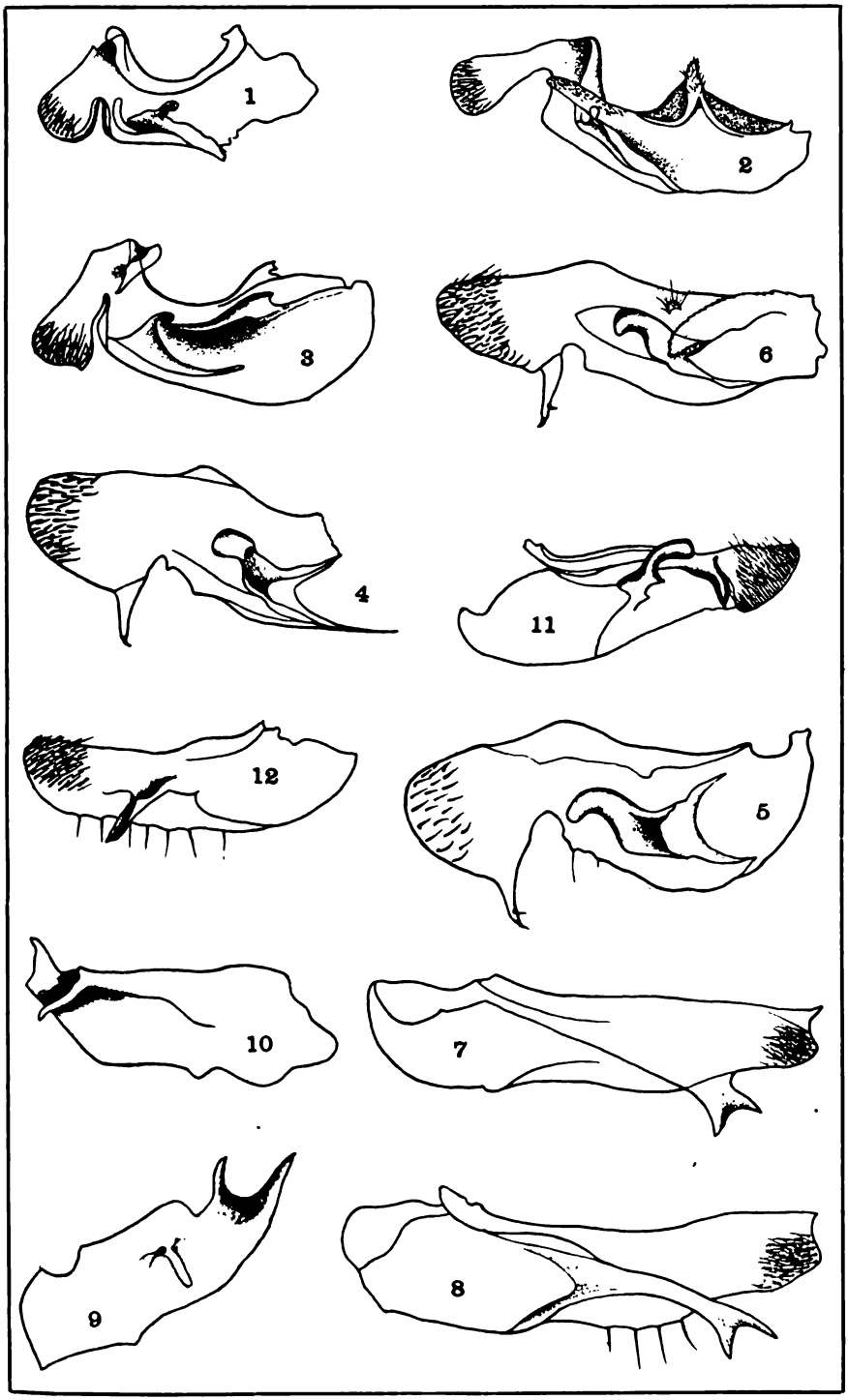
Hab.—Hastings, Florida, March and October.

Six males, from Mr. Kearfott, vary decidedly in the distinctness of the maculation on the upper side. In one example there is scarcely a trace of the shade lines, and only the ordinary spots are marked; in another both are emphasized by black scales and very clearly seen; between these extremes the other specimens range. The lack of antennal pectinations in this species has been already referred to as distinctive. I have two female examples in which the primaries are almost lanceolate, and the secondaries are white. The

maculation is exactly that above described, and did they come from the same region I would consider them as belonging with my male examples, but they come from Texas, in April, and the differences are sufficient to leave me in doubt; therefore, the examples are merely mentioned as possible females of *roseola*..

EXPLANATION OF PLATE III.

1. Harpe of clasper of ♂ *Trichoclea postica.*
2. " " ♂ " *nova.*
3. " " ♂ " *antica.*
4. " " ♂ *Nephelodes tertialis.*
5. " " ♂ " *violans.*
6. " " ♂ " *pectinata.*
7. " " ♂ *Fishia exhilirata.*
8. " " ♂ " *yosemitæ.*
9. " " ♂ *Pleroma bonuscula.*
10. " " ♂ " *obliquata.*
11. " " ♂ *Hadena pauxis.*
12. " " ♂ " *mactata.*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Descriptions of New Species of HYMENOPTERA taken by Mr. Edward Whymper on the "Higher Andes of the Equator."

BY P. CAMERON.

(New Mills, by Stockport, England.)

The circumstances under which the Hymenoptera described herewith were taken are related by Mr. Whymper in his "Travels amongst the Great Andes of the Equator," 1892, p. 356. The parasitic species I have described in "The Entomologist" for the present year.

SCOLIIDÆ.

Campsomeris (Elis) ephippium Say.

The form taken by Mr. Whymper is *C. Wagneriana* Saussure, which was described from Chimborazo. It differs from the type in having the wings clear, or almost clear, hyaline; whereas in the type they are dark fuscous violaceous. The orange bands on the abdomen are paler than in the type. The species was taken by Mr. Whymper at Betiocen, Pinantura and Antisanella, 11,000 feet; Guallabamba to Guachala, 7500 feet, and Ambato, 8000 feet.

The var. *Wagneriana* is probably a high-mountain form. It is figured by Mr. Whymper in his travels, p. 96, and he mentions there that it is known by the name of "the Bishop."

Campsomeris (Elis) costalis Lep.

One example of this common neotropical species from S. Lucia, 8000 feet.

Campsomeris (Dielis) argenteopilosa sp. nov.

Black; the head and thorax densely covered with silvery pubescence and with black hair; the apices of the second and third abdominal segments fringed with white hair; the wings hyaline, the radial cellules tinged with dark fulvous; the radial cellule long, projecting largely beyond the cubital. ♂. Length 20–21 mm.

Head punctured, except for a broad curved line on the top of the front and the clypeus, except round the sides and top; the smooth parts are bare; the rest punctured and bearing stiff black hairs; the occiput and outer orbits are thickly covered with pale hair. Mesonotum punctured closely, but not strongly; the apical part in the middle smooth. The scutellum is similarly punctured, except in the middle which is smooth, the smooth part being broadest at the apex. The

post-scutellum and the median segment are closely and uniformly punctured throughout, densely covered with silvery pubescence and with black hair. The hair on the legs is white: the spines and calcaria are black; the coxæ are covered with silvery pubescence. The radial cellule is long, fully two-thirds of the length of the second cubital; the basal abcissa of the radius is roundly curved upwards; the apical is straighter and has an oblique slope; the second transverse cubital nervure is received near the middle of the cellule, it has the upper (and larger) part straight and oblique; the lower part is also oblique, but more rounded; the first recurrent nervure has the upper part straight and oblique; the second has the lower two-thirds broadly rounded backwards; the upper part straight and oblique. Abdomen deep black, thickly covered with black hair; the second and third segments are fringed at the apex and laterally with white hair, the apical half of the pygidium is smooth and bare.

Hab.—Ecuador, 1–2000 feet.

Characteristic of this species is the elongated radial cellule projecting largely beyond the apex of the cubital.

CEROPALIDÆ (olim Pompilidæ).

Pepsis sulcifrons sp. nov.

Black; the head and thorax covered thickly with a bright green pile; the abdomen with a bluish green pile; the legs dark blue, their base covered with a green pile; the wings fuscous, their lower basal half and a broader band extending from the transverse basal nervure to the third transverse cubital through the cubital cellules, fulvous-yellow; the second and third cubital cellules are streaked with fulvous in the middle. ♀. Length 18 mm.

Scape of antennæ thickly covered with green pubescence; the flagellum black, fuscous towards the apex. Head thickly covered with bright green pubescence and sparsely with long black hair; the front has a wide and deep furrow down the centre from the ocelli to the base of the antennæ. Clypeus transverse at the apex; the labrum is large, broadly rounded in front. Mandibles and palpi black; the former covered with green pubescence at the base; their apical tooth is long and bluntly rounded at the apex. Metanotum irregularly transversely striated, the striæ extending on to the upper half of the metapleuræ; the apex has a straight oblique slope. The yellowish cloud in the fore wings occupies the lower edge of the radial, of the first cubital, the whole of the second and third cubital, except for fuscous streaks in the centre, the greater part of the discoidals and of the submedian and anal cellules; in the first discoidal is an elongated fuscous cloud with a hook-shaped projection at the base. The second cubital cellule is distinctly longer than the third.

Hab.—Nanegal, 3–4000 feet.

Pepsis andicola sp. nov.

Black, densely covered with a purple pile; the flagellum of the antennæ dull black; the wings fiery-red; the base of the anterior narrowly at the base and the basal half of the posterior, black; the apices of both narrowly fuscous. ♀. Length 33 mm.

The head is moderately thickly covered with long black hair; the frontal fur-

row is deep; the apex of the clypeus is broadly, roundly bilobate; the middle being slightly, but distinctly incised. Mandibles and palpi black, opaque; the former sparsely covered with black hairs. The thorax is thickly covered with long black hair, which is shorter and sparser on the mesonotum and longer and denser on the median segment and on the sternum. The scutellum is glabrous, but this may be through rubbing; the post-scutellum is also without hair; the centre is deeply furrowed, the furrow being much widened at the apex, which is smooth and shining. The black cloud on the base of the fore wings is narrow, it not reaching to the middle of the space bounded by the base of the wings and the transverse basal nervure; the basal abscissa of the radius is almost straight, not curved, is thickened at the top and has an oblique slope; the apical abscissa is broadly rounded in the middle; its lower bend is not much longer than the upper; the third cubital cellule is above three-fourths of the length of the second. The basal part of the median segment is coarsely, irregularly striated; its apex, in the middle, is more finely and closely transversely striated, and it has a steep oblique slope; its upper side laterally is tuberculate. The spines on the legs are black. The last abdominal segment is thickly covered with black hair.

Hab.—Pichincha, 11-12,000 feet; Guallabamba to Guachala, 7,500 feet.

Comes near to *P. montezumia* Smith, from which it differs in the pile on the body being purple, not blue; in the apex of the median segment having an abrupt, oblique slope, whereas in Smith's species it becomes gradually rounded from the base to the apex; in the lower part of the apical abscissa of the radius being shorter and less oblique, the middle part projecting in the middle, the upper and lower ends being opposite to each other, while in *montezumia* the upper end is much nearer the apex of the wing than is the lower, and the 3rd cubital cellule above is longer compared with the 2nd.

Pepsis chilloensis sp. nov.

Length 24 mm. ♀.—This species has the general coloration and purple bloom of *P. andicola*, but is much smaller; the black basal cloud in both wings is broader; the apex of the clypeus is transverse in the middle, the 2nd cubital cellule is distinctly longer compared with the 3rd, and the thorax is not so densely haired, and the apical tooth of the mandibles is shorter and broader.

Clypeus sparsely punctured; its apex broadly transverse, with the sides rounded; on the top, in the middle, is a broad, shining keel; the part on either side of this is depressed; the labrum is brownish at the base, as are also the apices of the mandibles. Median segment thickly covered with long black hair; its apex has a straight, oblique slope; the metanotum is closely, finely transversely striated. The apical abcissa of the radius is roundly curved, the ends of the curve being opposite each other; its middle projects slightly, but distinctly, beyond the middle of the 3rd transverse cubital nervure; the 2nd cubital cellule is distinctly longer than the 3rd above. The black cloud on the base of the fore wing, on the lower side, extends close to the transverse basal nervure; in the

hind wings almost the basal two-thirds are black. The abdomen has a blue, mixed with a violaceous, bloom; the last segment is thickly covered with long black hair.

Hab.—Chillo, 9000 feet.

The depressions on the sides and base of the ocelli are large, deeper and more clearly defined than usual; the apical tooth of the mandibles is short and broadly rounded; it is much shorter, broader and not narrowed towards the apex as it is in *P. andicola* and *P. montezumia.*

Salius Whymperi sp. nov.

Black, densely covered with a purple and violaceous bloom, especially the abdomen; the flagellum of the antennæ pale fulvous; the wings dark fuscous-violaceous. ♀. Length 22 mm.

Head sparsely covered with longish black hair; the frontal furrow is distinct; the ocelli are separated from the eyes by four times the distance they are from each other. The metanotum is more purplish in tint than the rest of the thorax; it is strongly, irregularly transversely striated; the sides are covered with long black hairs. The post-scutellum is thickly covered with long black hairs. The 2nd cubital cellule is distinctly shorter, above and below, than the 3rd; the 1st recurrent nervure is received near the base of the apical fourth of the cellule; the 2nd near the apex of the basal third; the third transverse cubital nervure is roundly curved, with the upper part more obliquely sloped. In the hind wings the accessory nervure is received distinctly beyond the transverse median. There is a faint hyaline spot at the base of the discoidal cellule. The breast, coxæ and trochanters are thickly covered with long black hair; the spines on the tibiæ and tarsi are black; the claws have one sharp tooth at the base. The last abdominal segment is black and is thickly covered with long black hair.

Hab.—Cotocachi, 12,000 feet. Illiniza, 12,000 feet.

Salius ecuadorensis sp. nov.

Black; the abdomen with a bluish and violaceous bloom, the latter especially on the hinder segments; the pygidium thickly covered with stiff bright golden pile and with some longish black hair; the flagellum of the antennæ bright, light fulvous; the wings yellow, black at the base. Claws with one tooth. ♀. Length 13 mm.

The head has a purple violaceous bloom; the front has a narrow, but distinct, furrow down its centre; the eyes do not converge much at the top; the temples are broad, rounded and not narrowed behind. The apex of the clypeus is slightly, broadly incised in the centre, with its sides broadly rounded; the labrum is distinctly visible. The 2nd and 3rd cubital cellules at the top are equal in length; the first transverse cubital nervure is sharply, the 2nd is less sharply oblique; the 3rd is broadly, roundly curved; the 1st recurrent nervure is received at the base of the apical third of the cellule, the 2nd shortly behind the middle. The abdomen has a brighter, more bluish tinge than the thorax; the apex of the 3rd and the following segments have a purple-violaceous hue. The tibial and

tarsal spines are black, except those near the apex of the latter; the claws have a short, erect spine near the base.

Hab.—Quito to Guillabamba, 9000 feet.

Hypoferreola machachiensis sp. nov.

Black, with a distinct purple bloom; wings fuscous-violaceous, the nervures and stigma black; the 3rd cubital cellule at the top not more than half the length of the 2nd; the 3rd transverse cubital nervure broadly, roundly curved. ♀. Length 8 mm.

Eyes not converging much above; they are separated there by fully the length of the 1st and 2nd joints united; the hinder ocelli are separated from the eyes by a slightly greater distance than they are from each other. The mandibles are broadly dark rufous behind the teeth. Wings uniformly fuscous-violaceous; the 1st and 2nd transverse cubital nervures are oblique; the 1st has an oblique slope on the top; the 2nd is slightly, roundly curved on the top; the 3rd is broadly roundly curved; its upper half has a more oblique, straight slope than the lower. The spines on the tibiæ and tarsi are black; the hinder tarsi have a brownish tinge. The temples are well developed; the apical abscissa of the radius is straight and oblique; the second recurrent nervure is received shortly beyond the middle; the transverse basal nervure is almost interstitial; the accessory nervure in the hind wings is received shortly behind the transverse median.

Hab.—Machachi, 9-10,000 feet.

In Ashmead's arrangement (Canad. Ent., 1902, 79) this species comes nearest to *Hypoferreola*. The prothorax is almost as long as the mesothorax; the subapical tooth of the mandibles is indistinct, the apical large and bluntly rounded; the apex of the clypeus is transverse, with the sides broadly rounded; the labrum has a slight but distinct incision in the middle. The tarsi are closely, the tibiæ more sparsely spinose; the claws have a small, erect tooth; the 2nd joint of the fore tarsi is fully half the length of the first. The pro notum is not "broad," but not "as long as the mesonotum" as in *Hypoferreola*, it being more as in *Epizuron* and *Pœcilopompilus*, the other genera in Ashmead's arrangement, with which it can be compared; but these are different in other respects.

Hypoferreola ambatœnsis sp. nov.

Black; when fresh, probably with a violaceous bloom; the wings fuscous, with a faint violaceous tint; the nervures and stigma black; the 2nd cubital cellule at the top twice the length of the 3rd, at bottom shorter than it; the pronotum, front and vertex thickly covered with long black hair. ♂. Length 8 mm.

Antennæ not much longer than the abdomen, stout, bare, except the underside of the scape which is covered with black hair. Head opaque, rather thickly covered with longish black hair; the upper half of the eyes curved inwardly, slightly converging above; the hinder ocelli are separated from each other by a slightly less distance than they are from the eyes. Wings uniformly fuscous-

violaceous; the basal half of the radius is roundly curved; the apical is equal in length to it and is straight and oblique; the 2nd cubital cellule at the top is one-third longer than the 3rd on the top: below it is shorter than it; the 1st and 2nd transverse cubital nervures are roundly curved; the 2nd recurrent nervure is received almost in the middle of the cellule; the transverse median nervure is not quite interstitial, it being received shortly beyond the transverse median; the accessory nervure in the hind wings is interstitial. The 3rd, 4th and 5th ventral segments bear a thick tuft of longish black hairs.

Hab.—Ambato, 8600 feet.

This species is not unlike *H. machachiensis*, but may be separated from it by the 3rd cubital cellule being longer compared with the 2nd, it being not much shorter than it, where in *machachiensis* it is hardly one-half its length; by the 3rd transverse cubital nervure being roundly curved, instead of having its upper half straight and obliquely bent; and the pronotum and head are thickly covered with long black hair, instead of being bare as in the other species.

SPHEGIDÆ.

Sphex (Harpactopus) Edwardsi sp. nov.

Black; the 2nd and following segments of the abdomen red; the wings fuscous-violaceous, the 2nd recurrent nervure interstitial with the 2nd transverse cubital; the claws with 4 short teeth. ♀ and ♂. Length 14 mm.

Has the form and coloration of *S. thomæ*, but is readily separated from it by the interstitial 2nd recurrent nervure and by the scutellum not being broadly depressed in the middle. Head on the top sparsely covered with white hair; the face, lower inner orbits and clypeus thickly covered with silvery pubescence and more sparsely with longish white hair. Eyes parallel, not converging. The apex of the clypeus has a large, somewhat semi-circular depression in the middle at the apex, which has a distinctly depressed margin. Thorax densely covered with greyish longish hair. Basal half of the mesonotum alutaceous; the apical finely, closely longitudinally striated. The scutellum is hardly depressed in the centre. The median segment is more distinctly punctured than the mesonotum; there is a smooth shining shallow furrow on either side leading to the stigmas. Wings uniformly colored; the second cubital cellule is scarcely longer above than the 3rd; it receives the first recurrent nervure near its base; the 2nd is interstitial, as is also the transverse basal nervure. The fore tarsi are thickly covered with long spines; the others and the tibiæ have shorter stouter spines; the long spur of the hinder tibiæ bears long spines, which become gradually shorter towards the apex of the spur. The abdominal petiole is long, curved and covered with soft white hair.

The ♂ has the head and thorax much more thickly haired than in the ♀; the 3rd cubital cellule is distinctly shorter compared with the 2nd; the apex of the petiole and the 2nd segment are broadly black above; the last abdominal segment becomes gradually narrowed towards the apex and is indistinctly keeled in the middle above.

Hab.—Ambato, 8630 feet.

APIDÆ.

Halictus ecuadorensis sp. nov.

Brassy-green, the abdomen darker, with the apical half of the segments blackish brown, smooth and shining; the antennæ black, the flagellum brown beneath, the wings clear hyaline, the nervures and stigma black. ♂. Length 6 mm.

Head closely punctured and covered with longish white hair; the middle of the face is clearly separated by furrows from the cheeks, which are more strongly punctured, thickly covered with white hair and brassy in tint. Clypeus closely and minutely punctured and having also some larger scattered punctures, its apex and the labrum are yellow. Mandibles black, reddish near the apex. Thorax closely, distinctly and minutely punctured and sparsely covered with longish white hair. Wings clear hyaline; the 1st recurrent nervure is interstitial. Legs black; the femora dark bronzy above; the tarsi dark testaceous and thickly covered with bright, white pubescence. The area on the metanotum is not defined; the base is closely, minutely, irregularly striated; the furrow on the apical slope is wide, deep and smooth; the apex of the pygidium projects semicircularly and has a distinct raised margin.

Hab.—Quito to Guillabamba, 9000 feet.

CÆNOHALICTUS gen. nov.

♂—Eyes clothed with long hair, large, distinctly curved inwardly on the innerside. Ocelli in a curve. Clypeus produced below; its apex broad, transverse. Pubescence plumose. Wings large, their neuration as in *Halictus*. Spurs finely and closely pectinated.

The temples are not prominent and are obliquely narrowed; the malar space is small. Mandibles deeply grooved in the middle. Labrum large, broad and transverse at the apex. Basal joint of tarsi not much dilated. Antennæ stout, their joints clearly separated; they are as long as the abdomen. There is no area on the metanotum. The abdomen is not much longer than the head and thorax united; it is moderately hairy; the pygidium is smooth and shining; its sides are distinctly raised.

The affinities of this genus are clearly with *Halictus*, from which it may be known by the hairy eyes and by the plumose pubescence. It is hair, not pubescence, which is on the eyes, not a close short pubescence as in *e.g. Cœlioxys*. It is almost as long as the hair on the head, and is shortly plumose. The ♀ I do not know.

Cænohalictus trichiothalmus sp. nov.

Dark olive-blue; the apical half of the abdominal segments black, smooth, bare and shining; the antennæ black, the apex of the clypeus dark bronze; the wings clear hyaline, the nervures and stigma black; the underside of the tarsi clothed with pale golden hair. ♂. Length 7-8 mm.

Antennæ black; the scape covered with long white hair; the flagellum bare. Front and vertex shagreened; the face and clypeus have a distinct metallic color and are distinctly and closely punctured, the clypeus more distinctly than the face; it has the apex of the clypeus deeply punctured, dark bronze in color, and is broadly and deeply depressed in the middle. Mandibles rufous near the apex. Thorax closely, minutely and uniformly punctured; the basal area on the metanotum is not defined. Legs black, thickly covered with long white, soft hair; the thick hair on the tarsi has a pale golden hue. Wings clear hyaline. the nervures and stigma black; the 2nd cubital cellule above, is about one-third shorter than the third; it receives the recurrent nervure at its apex, shortly before the 2nd tranverse cubital nervure. Abdomen sparsely covered with long white soft hair; the olive-blue basal half is shagreened; the apical black, smooth and shining; the last segment becomes gradually narrowed towards the apex, which is rounded; its sides are distinctly margined; it is smooth, bare, shining and for the greater part brown.

Hab.—Machachi, 9-10,000 feet.

Megacillisa albofimbriata sp. nov.

Black. the head and thorax thickly covered with white hair; as is also the basal abdominal segments; the 2nd, 3rd and 4th segments are fringed with white hair on the apex; the legs covered with black hair; the wings hyaline, their apical half with a faint violaceous tinge, the stigma and nervures black. ♀. Length 17-18 mm.

Antennæ black; the scape covered with longish black and white hair. Front, face and clypeus thickly covered with white hair, which is longest on the face; the vertex is thickly covered with long black hair. Mandibles smooth and shining, black, ferruginous at the apex; their lower side fringed with long white hair. The thorax has the pronotum and metanotum covered with long white hair; the hair on the mesonotum (which is smooth and shining) is sparser, blacker and shorter. The hair on the pleuræ is black; on the sternum it is longer and black. The radius has the base curved and thickened; the 2nd cubital cellule at the top is about one-third of the length of the 3rd; the recurrent nervures are received very shortly in front of the transverse cubitals, their apices touching them. The anterior tarsi are brownish; beneath they are thickly covered with dark rufous hair, this being also the case with end joints of the middle pair. Abdomen smooth and shining; the 2nd, 3rd and 4th segments are covered with short, black hair, except at the apex; this is also the case with the apical segments, which have their apices thickly covered with long black hair.

Hab.—S. Lucia, 8000 feet; Hac. S. Rosaria, 10,350 feet.

Megachile autisanellæ sp. nov.

Black; the head, thorax and base of abdomen thickly covered with long pale fulvous hair; the hair on the apical four segments of the abdomen deep black, its apex ending in two stout, longish teeth; the apical tooth of the mandibles long and acutely pointed; the basal abscissa of the radius nearly as long as the second. Length 11 mm.

Antennæ as long as the thorax, black; the last joint is distinctly longer than the preceding; it is slightly contracted at the base; its apical half is flattened

and compressed, and it becomes distinctly narrowed at the apex; the scape on the lower side bears some long pale fulvous hairs. Head closely punctured; the front, face, clypeus and outer orbits are thickly covered with long pale fulvous hair. Mandibles shining, sparsely punctured in the middle; the apical tooth is long and sharp-pointed; the two subapical are short, bluntly rounded and separated by a curved rounded incision. The thorax is closely and uniformly punctured and covered thickly with long pale fulvous hair; there is a smooth shining keel in the centre of the basal half of the mesonotum. The hair on the four anterior coxæ, trochanters and femora are long, thick and pale fulvous; on the posterior it is shorter and black; there is a short, bluntly rounded projection on the under side of the front femora at the apex; on the innerside and on the opposite is a similar, smaller projection; the hair on the underside of the front tarsi is bright golden. The hinder calcaria are large, stout and roundly curved. The apex of the wings has a faint violaceous tinge; the stigma and nervures are black; the basal abscissa of the radius is three-fourths of the length of the second.

Hab.—Antisanella, 11,000 feet.

Megachile guachalensis sp. nov.

Black; the head, thorax and base of abdomen thickly covered with longish white hair; the hair on the 3rd and following segments of the abdomen and the scopa deep black; the wings clear hyaline, the nervures and stigma black; the hair on the legs deep black. ♀. Length 13 mm.

Antennæ black; the scape thickly covered with short black hair, the flagellum obscure brownish beneath and covered with a white pile. Head closely and uniformly punctured; the face and clypeus more strongly than the upper parts; the front, sides of the face and clypeus and the outer orbits thickly covered with longish white hair. The apex of the clypeus is depressed; its middle is not quite transverse; the sides obliquely narrowed. The basal half of the mandibles on the outerside is closely but not strongly punctured and thickly covered with pale depressed pubescence; the inner basal half bears large, scattered punctures; the apex is broadly, roundly incised, forming two rounded teeth, the inner of which is broader than the outer; separated from it by a wide, rounded, curve is a shorter, less prominent one. The thorax is closely and distinctly punctured; the hair on the lower part of the pleuræ and on the breast is dark fuscous-black. The hair on the legs is long, dense and black; on the underside of the front tarsi it is brownish. The basal two dorsal segments of the abdomen are sparsely covered with longish white hair; on the other segments it is denser, shorter and deep black; the last segment above is more closely and distinctly punctured than the others; below it has the apical half shining. The wings are clear hyaline; the basal abscissa of the radius is fully two-thirds of the length of the second.

Hab.—Hac. Guachala, 9217 feet.

Anthophora guachalæ sp. nov.

♂.—Black; the scape of the antennæ broadly beneath, a narrow line on the lower edge of the front, the lower third of the clypeus, the labrum and a narrow line on the lower half of the inner orbits and a mark on the base of the mandibles, cream-yellow; the abdominal segments have pale yellow bands on their apices; the head and thorax are thickly covered with pale fulvous hair; the

apices of the abdominal segments have pale fulvous hair bands; wings hyaline, tinged with violaceous, the nervures and stigma black. ♀ similar, but wanting the yellow markings on the head and antennal scape. Length 12 mm.

Vertex shining and impunctate; the front has a smooth line down the middle and is obscurely shagreened. Clypeus closely punctured; the labrum is distinctly but not so closely punctured. Mandibles smooth and shining; the yellow mark on the ♂ mandibles is on the upper edge and is longer than broad. The mesonotum is shagreened; the metanotum is punctured, but not deeply or closely. The hair on the tibiæ and tarsi is long and black; on the coxæ and femora it is sparser and paler; the apical joints of the tarsi are dark testaceous; the hinder femora are brownish beneath; the calcaria are black. The basal segment of the abdomen is sparsely covered with pale fulvous hair; the apical hair bands occupy about one-fourth of the segment; the pygidial area is long and narrow and is raised in the centre. On the top the second cubital cellule is shorter than the 3rd; below it is longer than it. In the ♂ the apical abdominal segment has a distinct incision on its apex; the sides of the incision are oblique; the edges form bluntly rounded teeth. The ♀ wants the yellow markings on the head and antennæ found in the ♂. The ventral surface may be more or less brownish; in worn specimens the abdominal hair bands are whitish, without any fulvous-golden tint. The violaceous-fuscous tint varies in intensity; in one ♂ it is almost absent. The black band on the top of the ♂ clypeus is narrow in the middle, broad on the sides, where it becomes obliquely lengthened.

Hab.—Hac. Guachala, 9217 feet.

Comes near, apparently, to the Mexican *A. marginata* Sm.

Eucera andicola sp. nov.

Black; the head, metanotum and base of abdomen covered with long fulvous hair; the rest of the thorax with black hair; the 3rd and 4th segments above are thickly covered with bright shining rufous hair; the hair on the legs black; the mandibles have the apical half pale orange-red; the wings hyaline, with a distinct violaceous tinge, the stigma and nervures black. ♀. Length 13 mm.

Clypeus sparsely punctured and sparsely covered with pale fulvous hair; the labrum is thickly covered with longish pale fulvous hair. Mandibles broad and almost transverse at the apex; the centre with a slight incision; there are no teeth on it. Mesonotum shining, smooth and covered with black hair. The 2nd transverse cubital nervure is received distinctly behind the middle; the 2nd recurrent nervure is interstitial; the 1st at one-third of the length of the 1st transverse cubital nervure from the base of the cellule. The hair is thick on all the legs; is long and black; the apical joints of the tarsi are testaceous. The hair on the basal abdominal segment is sparse, long and pale fulvous; it is deeply and widely hollowed in the middle at the base; the black hair on the second segment is short and sparse; the bright rufous hair on the 3rd segment is sparse on the base and does not reach to the sides; on the 4th it covers the dorsal surface; on the 5th the hair is dark rufous on the base; the pygidial area is bare, its sides widely depressed and obscurely transversely striated. The hair on the ventral surface is black; on the penultimate segment dark rufous. The tarsal claws are stout, at the base pale yellow; they are bifid; the inner tooth more than half the length of the apical.

Hab.—Chillo, 9000 feet.

Having only a single example, I have not been able to examine the palpi; but, so far as the other points are concerned, the species does not differ materially from typical *Eucera*, except that the legs are more thickly haired and with the hair longer, and that the apex of the mandibles is, if anything, more transverse. The general form and coloration is not typical of *Eucera*. In this respect it agrees closely with *Habropoda carinifrons* Cam.

Habropoda ? carinifrons sp. nov.

Black, smooth and shining; the median segment covered with long fulvous hair; the 4th abdominal segment above covered with bright, shining golden rufous hair; on the 5th it is fuscous; the wings hyaline, with a steelly iridescence; the stigma and nervures black. ♀. Length 12 mm.

Front and vertex smooth and shining and covered, but not thickly, with long black hair; the front has a stout keel down its centre; at its apex it is covered with rufous pubescence. The clypeus is covered with short black hair, except on the apex which is smooth; the labrum is covered with long pale fulvous hair. Thorax smooth and shining. Legs thickly covered with stiff black hair. Abdomen smooth and shining; the basal 3 segments are covered with black hair; the 4th, except at the sides, with bright, shining rufous hair; the 5th with dark fuscous; the last bare; its pygidial area smooth, slightly depressed; the sides of the segment obscurely transversely striated.

Hab.—Hac. Guachala, 9217 feet.

This is probably not a *Habropoda* as now limited by American Hymenopterists. Having only a single example, I have not ventured to dissect the trophi. It is perhaps an *Emphoropsis*. The 1st recurrent nervure is interstitial; the 2nd almost so; the 2nd cubital cellule is distinctly shorter than the 3rd above and below; it is slightly wider at the top than below. As compared with the Indian species of *Habropoda*, the basal nervure is shorter and more roundly curved; the 1st and 2nd discoidal cellules are shorter, broader and more equal in length, whereas in the Indian species the 1st is much longer than the 2nd, and both the face and the clypeus are longer compared with their breadth than they are in the Andean species.

PARACENTRIS gen. nov.

♂.—Third joint of antennæ much longer and narrower than the other, dilated at the apex, as long as the 3 following joint united. Ocelli in a curve. Mandibles with a long apical tooth, rounded at the apex and a short, bluntly pointed subapical one. The 2nd cubi-

tal cellule is distinctly longer, above and below, than the 1st or 3rd; the 3rd is much narrowed above, being there not one-fourth of its length at the bottom, the 1st recurrent nervure is received near the middle, the 2nd near the apex of the cellule. Legs thickly covered with long black plumose hairs. Labial palpi 4-jointed; the basal joint four times longer than the 2nd; maxillary palpi 6-jointed, the joints of almost equal length.

The body and legs are densely clothed with long hair; the antennæ are hardly longer than the thorax; the clypeus and labrum are white; the latter is large and is gradually narrowed towards the apex; the fore spurs bear a large diaphaneous plate on the inner side; the long spur of the hinder calcaria is closely and uniformly pectinated; the claws are stout and bifid; the pygidium has a nar row, smooth bare area in its middle. The tongue is of moderate length; the hairs on the maxilla are long and plumose. The radial cellule is shorter than the 3 cubital cellules united, being as long as the 2nd and 3rd on the lower side.

I unfortunately have only males of this species. Its affinities are clearly with *Centris*, with which it agrees in neuration, body form and in having the 3rd antennal joint greatly elongated; but may be known from it by the differences in the trophi and by the pectinated spurs.

Paracentris fulvohirta sp. nov.

Black; the clypeus and labrum and apex of the mandibles, on the underside, pale yellow; the face, sides of the clypeus and the labrum covered with pale fulvous hair; the upper side of the thorax thickly covered with long fulvous hair; the hair on the pleuræ and the sternum with long soot-colored hair; the hair on the abdomen and legs black; the wings hyaline, the nervures and stigma black. ♂. Length 15 mm.

Antennæ black, the flagellum fuscous. Clypeus smooth and shining; its centre bare, the edges covered with long white hair. Except round the edges, the labrum is distinctly punctured. Mandibles smooth and shining; the middle with a long, deep groove; the part between the end of the groove and the apex yellow. The front below the ocelli is smooth, bare and shining; the rest of it is thickly covered with long black hair; the vertex in the centre has a patch of long pale fulvous hair. The hair on the upper part of the thorax is long, thick and pale fulvous; on the upper part of the thorax it is pale fulvous; on the rest of the pleuræ and on the sternum it is long and soot-colored. Abdomen black, with a slight bluish tint; smooth and shining; the pygidium is bare in the middle; at the base the bare part is raised and rufous. The ventral surface is thickly covered with long, dark soot-colored hair.

Hab.—Machachi, 9–10,000 feet.

Xylocopa viridigastra Lep.

Quito, 9000 feet; Chillo, 9000 feet; Nanegal, 3–4000 feet.

Bombus funebris Sm.

Described from Quito. Taken by Mr. Whymper at Machachi, 9–10,000 feet; Hac. Guachala, 9217 feet; Pichincha, 11,500 feet; Chillo, 9000 feet; S. Lucia, 8000 feet; Hac. S. Rosario, 10,300 feet.

The males and workers are colored like the females, black, with silvery white hair on the back of the thorax and on the apex of the abdomen.

Bombus robustus Sm.

One example from Pichincha, 11,500 feet.

Agapostemon peruvianus sp. nov.

Head and thorax brilliant emerald-green and thickly covered with long whitish-fulvous hair; the abdomen black; the halves of all segments yellow; the labrum, mandibles and the greater part of the legs yellow; the antennæ black, brownish beneath; wings hyaline, the stigma testaceous, the nervures black. ♂.

Scape of antennæ yellow, black above; the flagellum black, fulvous beneath, except on the apical two joints. Head emerald green, except the apex of the clypeus and the labrum, which are yellow, it is closely but not very closely punctured. The clypeus is large, broadly rounded above and with a bundle of stiff brownish bristles on the top in the centre; beneath the sides are broadly roundly produced and clearly separated from the labrum which has its apex broadly rounded; its sides are rounded and it is clearly separated above and covered with short white pubescence. Mandibles thickly covered with golden pubescence, yellow, their apex piceous. Thorax brilliant emerald-green, closely and distinctly punctured. The mesonotum is more closely punctured than the rest; it bears a central and a lateral golden impressed line; the scutellum is more distinctly and less closely punctured; the area on the median segment is large, rather strongly reticulated; the apical slope is clearly limited and bears some irregular, curved striæ. Pleuræ closely and strongly punctured, the punctures running into striations; the hinder part of the mesopleuræ is irregularly striated, and at the base is bounded by a curved furrow; the lower part of the metapleuræ bears some irregular striæ, which are longest on the apex. The four front legs have the coxæ and trochanters black; the latter streaked with yellow in the middle; the hinder coxæ are emerald-green and closely striated above; the rest brownish; the hind femora black, with a broad yellow line on the apical half above; the hinder tibiæ are dark brown, yellow beneath. The yellow band on the 1st abdominal segment is on the apex, on the others on the basal half, the apical two bands are narrower than the others; the ventral segments have similar, but narrower bands.

Hab.—Callao, Peru (I. I. Walker, R. N.).

Megacillisa fulvo-pilosa sp. nov.

Black, thickly covered with longish fulvous pubescence; the lower inner orbits, the clypeus and the labrum yellow; the abdomen with a blue-violaceous

tint; the legs dark blackish brown; the anterior tarsi and the apical 4 joints of the 4 posterior rufo-testaceous; the wings fulvous-hyaline, the nervures fulvous. ♂. Length 15 mm.

Antennæ black, the scape dark brown. Head smooth and shining; the clypeus, lower inner orbits and the labrum yellow; the clypeus with a few scattered punctures; a smooth, black shining keel leads down from the front ocellus. Mandibles brownish-black, brighter, more rufous in color in the middle. Thorax thickly covered with long fulvous hair, except on the centre of the median segment, which is bare, smooth and shining and dark brown in color. The hair on the coxæ, trochanters, femora and anterior tibiæ is long, dense and pale fulvous in color; on the 4th anterior tarsi it is rufous, except on the middle tibiæ and base of tarsi in front, on which it is black; on the hinder tibiæ and tarsi it is for the most part black. The 2nd cubital cellule is small, at the bottom about one-fourth of the length of the 3rd; at the top it is narrowed, the transverse cubital nervures (which are roundly curved) almost touching there. The five apical dorsal segments have a distinct metallic tint and are shining; the last ventral segment is broadly raised in the middle. The hinder tibiæ are slightly curved; the outer spur of the hinder calcaria is long, curved, broad at the base, becoming gradually narrowed towards the apex and finely pectinated in the middle; the inner is longer, narrower at the base and much more stoutly combed throughout; the 2nd and 3rd tarsal joints of the posterior legs are dilated and compressed beneath; they become gradually, roundly wider from the base to the apex; the labrum is roundly convex and unfurrowed.

Hab.—Panama (Pacific side), G. F. Mathew.

Comes near to *M. eximia* Sm. In being densely clothed all over with long pubescence it resembles *M. pubescens* Sm., but that is very different otherwise.

Some Notes on the Bee Genus ANDRENA.

BY LAWRENCE BRUNER.

Several years ago the writer undertook to determine and lable the bees contained in the collection of insects belonging to the University of Nebraska. After some preliminary work in the way of assorting and arranging the material at hand, and securing literature with which to do the naming, it was found that the large number of the species belonging to the genus *Andrena* in its broad sense could only be placed by the aid of some kind of synoptic key or table. Not being able to find such an aid in our entomological literature it was decided to construct one for the purpose.

This being decided upon, it was soon ascertained that the various authors who had established the already recognized and recorded species had used different characters upon which to base their descriptions. The use or choice of distinct characters by the various authors when describing their species made it very difficult for the writer when attempting to decide upon the principal features of the proposed table in order to make it as nearly a natural one as possible. After several vain attempts at employing structural characters for the separation of the main groups, at least, all efforts in this direction ceased, and such secondary characters as the presence or absence, length, abundance, color and arrangement of pubescence were employed instead. This choice was made necessary because, as stated above, the various authors when characterizing their new species had overlooked many of the structural characters now used in the limitation of forms.

While nothing like perfection is claimed for the present table as it now stands, it has been a great help to the writer in his attempts at placing the hundred or more forms belonging to the collection which he is working over. It is with this knowledge in mind that the table is offered to others who may be interested in our Andrenid bees. Later, after more of our species that are still undescribed have been determined and characterized, and when both sexes of some known species have been recognized, a new and better table can be constructed.

In describing bees of this group it would be well to employ such characters as punctuation of face, thorax and abdomen; the nature of the triangle (inclosure) at the base of the metathorax—whether bounded by a rim or by an impressed line; its surface, whether rough or smooth; shape and size of head and its attachments, as antennæ, tubercle at apex of clypeus, mandibles, etc.; form of abdomen, depression of apical portion of segments; any special characteristic of legs, as of tibiæ and tarsi; pubescence, length, abundance, arrangement, color, etc.; general color of wings, and indication of variation of form and size in cells, nervures and stigma; abundance and color of anal fimbria in the female; also the general color of the insect or of any portion of it. If all, or most, of these points are kept in mind when a new form is characterized, the difficulty of its recognition by others will be greatly lessened. It will also enable the would-be tabulator to construct his key on characters that are less artificial and therefore more constant than those employed here.

While working over the described American forms it was found that a few synonyms occur. In order to make the paper a trifle more complete there are added below:

Andrena bicolor (Amer. citations—not Fabr.) = *carlini* Ckll.
" *fimbriata* Sm. = *americana* D. T.
" *flavoclypeata* Sm. = *bipunctata* Cress.
" *simulata* Prov. = *canadensis* D. T.
" *clypeata* Sm. = *clypeolata* D. T.
" *laticeps* Prov. = *Provancheri* D. T.
" *serotina* Rob. = *Robertsonii* D. T.
" *scutellaris* Rob. = *scutellata* D. T.
" *hirticeps* Rob. (not Sm.) = *carlini* Ckll.
" *Perezi* Rob. = *erythrogastra* Ashm.

A Preliminary Table for the Separation of the Species of Andrenæ of America north of Mexico.

Normally with three submarginal cells in anterior wings—(**Andrena, Trachandrena, Opandrena, Ptilanerena, Pterandrena** and **Iomelissa**.....1.

Normally with but two submarginal cells in anterior wings...(**Parandrena**) 229.

1. Insect with the abdomen above more or less markedly rufous, ferruginous, orange or testaceous.....2.

   Insect with the abdomen not at all rufous, ferruginous or orange, or if testaceous, only slightly so at extreme apex of segments.....18.

2. With the light color chiefly ferruginous or rufous.....3.

   With the light color orange, yellowish or testaceous—basal, apical or both..16.

3. Pubescence black ..... **prima** Casad.
Pubescence gray or fulvous ..... 4.
4. Wings clear or only faintly clouded ..... 5.
Wings rather strongly clouded apically ..... 10.
5. Enclosure of metathorax bounded by a salient rim, the surface more or less strongly longitudinally ridged ..... 6.
Enclosure indistinctly marked, the surface rather finely granular ..... 7.
6. Abdomen red, except sides of 1st and 2nd segments—both sexes. **sphecodina** Casad. & Ckll.
Abdomen of female with the apical margins of the segments and apical segments more or less black, that of male black, save occasionally with indications of red on the ventral surface of 1 and 2 .... **Mariæ** Rob.
7. Head and thorax black, or varied with yellow, finely granular. Insects large or of moderate size ..... 8.
Head and thorax with bluish and greenish reflections. Insects rather small. **illinoiensis** form **bicolor** Rob.
8. Insects of moderate size (about 10 mm.) ..... 9.
Insects rather large (12 mm. or over) ..... 10.
9. Abdomen of female red, sometimes with base of apical segments broadly black and with their apices testaceous; the males similar, but frequently entirely black. Wings hyaline, apical margins faintly clouded. **erythrogastra** Ashm.
Abdomen of female with base of all segments broadly black. Wings with a strong reddish yellow tinge ..... **rhodura** Ckll.
10. Clypeus dark in both sexes ..... 11.
Clypeus not dark, at least in the ♂ ..... 12.
11. First segment of abdomen very feebly and sparsely punctured. **Jessiæ** Ckll.
First segment of abdomen strongly punctured ..... **argemonis** Ckll.
12. Dorsum of thorax honey-yellow ..... **mellea** Crrss.
Thorax entirely black ..... 13.
13. Pubescence on head and thorax pale yellow or fulvous ..... 14.
Pubescence on head and thorax dull white ..... 15.
14. Pubescence fulvous; basal joints of antennæ more or less strongly ferruginous ..... **prunorum** Ckll.
Pubescence pale yellowish; antennæ entirely dark. **prunorum** sub. sp. **Gillettei** Ckll.
15. Second segment of abdomen provided with a black band ... **Casadæ** Ckll.
Second segment of abdomen with only a black spot on each side. **pascoensis** Ckll.
16. With the light color orange and confined to the apex and base of segments. **aureocincta** Ckll.
The light color reddish or yellowish testaceous ..... 17.
17. Larger (13.5 mm.), the pubescence rather long and copious, yellowish. Apex of segments yellowish testaceous. Venter honey yellow. **melliventris** Cress.
Smaller (8.5 mm.), the pubescence scant, pale. Apex of segments broadly reddish. Fimbria pale ..... **lineata** Prov.

18. Body of insect altogether or in part blue, green or brassy (æneous).....19.
Body of insect black, with or without yellow face marks.....35.
19. Insect with head and thorax concolorous with abdomen .....25.
Insect with head and thorax differently colored from abdomen ....20.
20. Head and thorax black, abdomen more or less bronzy, green or blue. ....22.
Head and thorax greenish.....21.
21. Abdomen ferruginous.....**illinoiensis** form **bicolor** Rob.
Abdomen with a faint greenish lustre.....24.
22. Abdomen with a brassy tinge.....23.
22. Segments 2–5 with their apices slightly depressed, anal fimbria fulvous.
subtilis Sm.
Abdomen finely roughened, impunctate, apical margins of segments depressed and narrowly testaceous, anal fimbria fuscous; cheeks in male subtriangular, the angle opposite the middle of the eye...**erythronii** Rob.
24. Segments 3–5 with thin bands of long white hairs, anal fimbria bright orange fulvous; male with the pubescence on thorax with fulvous tint, and hair at apex of abdomen yellowish or nearly white.
subaustralis Ckll.
25. Abdomen with well-defined hair bands.....26.
Abdomen without well-defined hair bands .....32.
26. General color blue-black; anal fimbria dirty white, the abdomen of male bluish, the apex not densely tufted.....**geranii** Rob.
General color nigro-æneous, anal fimbria rufo-fuscous.....**candida** Sm.
General color greenish, with blue and purple reflections.....27.
27. Face of ♂ without yellow markings..... .....31.
Face of ♂ with whitish yellow markings..... .....28.
28. Females .....29.
Males.....30.
29. Fovea narrow; clypeus bare, convex, metallic; enclosure rugose; cell III long .....**personata** Rob.
Fovea broad; clypeus more pubescent, flatter, not metallic; enclosure less rugose; cell III shorter.....**zizise** Rob.
30. Antennæ short, joint 3 nearly equalling 4 and 5 together; clypeus rather flat, whitish; sometimes with a whitish dot on each side of face.
zizise Rob.
Antennæ long, joint 3 no longer than 4; clypeus convex, whitish, as well as a spot on each side of face ....**personata** Rob.
31. Robust, enclosure of metathorax narrow, the scutel not purplish.
polemonii Rob.
Slender, enclosure of metathorax broad, the scutel purplish.
illinoiensis Rob.
32. Abdomen strongly and closely punctured .....**cerasifolii** Ckll.
Abdomen impunctate, shining.....33.
33. Anal fimbria black; the pubescence of face also black.
nigrocærula Ckll.
Anal fimbria brownish; the pubescence of face mostly pale.....34.
34. Pubescence of thorax ochraceous, on metatnorax black.....**cærulea** Sm.
Pubescence of thorax white, the few black hairs inconspicuous.
territa Ckll.

35. Insects with whitish or yellowish face marks ....36.
Insects without such face marks .....64.
36. Females .....37.
Males.....40.
37. Spot of lemon yellow on each side of face .... 38.
38. Clypeus dark, apical margins of abdominal segments pale testaceous **pulchella** Rob.
Clypeus in part or wholly yellow .....39.
39. Clypeus pale lemon yellow with sides black; with semicircular spot on sides of face below the eyes..... .....**Aliciarum** Ckll.
Clypeus entirely yellow, apical margins of abdominal segments provided with narrow fasciæ of white pubescence.....**Aliciæ** Rob.
Sometimes with a yellow spot on clypeus, in the median line not far from the anterior edge..... **Kincaidii** Ckll.
40. With both the clypeus and a spot on each side of face white or yellowish..41.
With clypeus alone light colored.....52.
41. abdomen impunctate, the surface finely tesselate.....42.
Abdomen distinctly punctured... .....44.
42. Very small, not over 6 mm. long, the face marks whitish. **personata** Rob.
Larger, between 7 and 9 mm., face marks yellow or yellowish .....43.
43. Thorax with sparse, feeble punctures, its pubescence dirty white. **asteris** Rob.
Thorax minutely tesselate, with strong quite numerous punctures, its pubescence pale ferruginous..... **Cragini** Ckll.
44. Clypeus wholly light colored, except anterior edge and the usual two dots; vernal species..... .....46.
Clypeus with more or less black; autumnal species.....45.
Clypeus sometimes with a small yellow spot, also one such spot on each side of face..... .....**violæ** Rob.
45. Sides of clypeus black, wings dusky at apex, first two abdominal segments with orange-fulvous bands.....**Aliciarum** Ckll.
Anterior margin of clypeus broadly black, wings clear....**pulchella** Rob.
46. Face markings lemon yellow .....47.
Face markings cream color..... .....50.
47. Joint 3 of antennæ shorter than 13, about at long as 5, entire apical margin of clypeus black, lateral face marks small or wanting...**dubia** Rob.
Joint 3 of antennæ as long as 13, and as long as 4 and 5 together. .....48.
48. Pubescence orange fulvous. Sometimes with a supraclypeal light patch. Antennæ dark. Wings a little dusky at tips .....**kansensis** Ckll.
Pubescence dull white .....49.
49. Middle of anterior margin of clypeus black, lateral face marks large. **Cressoni** Rob.
Entire apical margin of clypeus black, lateral face marks small or wanting. **Bridwellii** Ckll.
50. Length 12 mm., flies in June.....**rudbeckiæ** Rob.
Length not ever 8 mm., fly in March and April.....51.
51. Larger, flagellum dark.....**capricornis** Casad. & Ckll.
Smaller (6 mm.), flagellum ferruginous .....**primulifrons** Casad.

52. Larger species (10–12 mm.) ..... 53.
Smaller species (5–9 mm.) ..... 58.
53. Stigma comparatively small ..... 54.
Stigma normal ..... 55.
54. Wings clear hyaline; abdomen minutely tessellate ..... **Barberi** Ckll.
Wings whitish; abdomen rather finely punctured, the apical portions of segments rather broadly pale testaceous ..... **helianthi** Rob.
55. Abdomen without punctures, the head of moderate width ..... **Aliciæ** Rob.
Abdomen punctured, the head rather large ..... 56.
56. Head broader thad thorax, the apical margins of abdominal segments broadly pale testaceous ..... **reflexa** Cress.
Head and thorax about equal in width ..... 57.
57. Abdomen covered with fine, short, appressed hairs which form bands on segments 4 and 5 ..... **fracta** Casad. & Ckll.
Abdomen without hair bands, flies late in the spring ..... **Kincaidii** Ckll.
58. Pubescence on thorax ochraceous or pale fulvous ..... 59.
Pubescence on thorax gray or white ..... 60.
59. Head and thorax clothed with ochraceous pubescence ... **clypeolata** D. T.
Pubescence on head and thorax inclining to fulvous ..... **scutellata** D. T.
Clypeus with a large trilobed yellow spot ..... **krigiana** Rob.
60. Flagellum of antennæ testaceous or ferruginous beneath ..... 61.
Flagellum of antennæ darker, brown or black beneath ..... 63.
61. Nervures brown. Segments 2–4 of abdomen with very distinct white bands. **simulata** Prov.
Nervures of wings lighter, honey yellow or testaceous ..... 62.
62. Cheeks narrow, convex, regularly rounded; enclosure unusually broad and rough; abdomen finely sparsely punctate; clypeus yellow. **Robertsonii** D. T.
Cheeks broad, flat, subtriangular, with rounded angles behind middle of eye; enclosure small, finely rugose, except basal middle; abdomen almost impunctate; clypeus and sometimes spot on each side of face yellow. **bipunctata** Cress.
63. Clypeus chrome yellow; abdomen finely punctate, flies in spring. **Trevoris** Ckll.
Clypeus pale yellow; abdomen impunctate, flies in the fall. **solidaginis** Rob.
64. Abdomen without well defined hair bands ..... 65.
Abdomen provided with more or less complete hair bands ..... 120.
65. Abdomen smooth, shining, almost without pubescence ..... 66.
Abdomen more or less thickly and evenly covered with pubescence ..... 109.
66. Pubescence entirely black ..... 67.
Pubescence more or less fulvous, ochraceous, testaceous or cinereous ..... 70.
67. Thorax with the pubescence dense, hiding the surface ..... 68.
Thorax with the pubescence rather sparse, not hiding the surface ..... 69.
68. Insects larger (17½ mm. in length); wings purplish fuliginous ... **valida** Say.
Insects smaller (13 mm.); wings smoky red ..... **nigra** Prov.
69. Wings dusky hyaline; abdomen closely and finely punctured. **nigerrima** Casad.
Wings yellowish hyaline, abdomen practically impunctate .. **Porteræ** Ckll.

70. Pubescence quite dense on face and thorax above.....71.
Pubescence rather thin when compared to that of the species belonging to the alternate section.....86.
71. With bright ferruginous or fulvous pile.....72.
With the pubescence paler—some shade of testaceous, light ochraceous, gray or white.....76.
72. Robust, rather large species (12-17 mm.), with thoracic pubescence quite dense.....73.
More slender smaller species (10-12 mm.), with the thoracic pubescence slightly less dense, ochraceous.....83.
73. Occiput and thorax above with ferruginous pubescence; anal fimbria black..74.
Face, cheeks, occiput and thorax above with such pubescence; anal fimbria fulvous.....75.
Occiput and thorax above with fulvous pubescence; anal fimbria sooty black intermixed with ferruginous hairs.....**nivalis** Sm.
74. Larger (14-17 mm.); with a black-appearing band between the tegulæ. **Hallii** Dunning.
Smaller (13 mm.); without blackish bands between the tegulæ. **semirufa** Ckll.
75. Smaller (13-14 mm.); wings yellowish hyaline.....**Belfragei** Cress.
Larger (15 mm.); wings reddish brown, with violaceous reflections. **obscuripennis** Sm.
76. Females.....77.
77. Insects moderately large and robust (12-14 mm.).....78.
78. Anal fimbria sooty.....79.
Anal fimbria fulvous.....84.
79. Inclosure at base of metathorax strongly longitudinally plicate. **cupreotincta** Ckll.
Inclosure at base of metathorax at most roughened, not at all longitudinally plicate.....80.
80. Abdomen rather free from hairs, smooth and shiny.....81.
Abdomen decidedly hairy throughout.....82.
81. Surface of abdomen smooth, polished; hairs on face and head black; the facial grooves lined with a silvery down.....**nigripes** Prov.
Surface of abdomen tessellate and well punctured; hairs on face and head mixed with pale and black.....82.
82. Pubescence on the pleuræ black; that on the face mixed with pale and black. **carlini** Ckll.
Pubescence on pleuræ pale; that on face black only around the mouth. **vicina** Sm.
83. Hair of face wholly black; area at base of metathorax more closely rugulose, narrower; tubercle small and emarginate or binodulose at apex. **anogræ** Ckll.
Hair of face a little paler at sides and on occiput; area at base of metathorax roughened, not plicate, rather broad and long; tubercle with sloping sides and truncate at apex.....**pluvialis** Ckll.
84. Pubescence on thorax above and the pleuræ fulvo-ochraceous. **Dunningi** Ckll.

Pubescence on head, thorax and femora fulvous, brightest on scutellum. **viciniformis** Rob.

Pubescence on head and thorax above ochraceous; abdomen with shallow punctures; anal fimbria obscure fulvous. Male smaller, but for most part with similar pubescence and clearer wings .....**errans** Sm.

85. Pubescence ochraceous only on mesothorax, scutellum and postscutellum. **Merriami** Ckll.

Pubescence on mesothorax, scutellum, postscutellum, metathorax, upper part of pleura and on first and base of second abdominal segments ochraceous .....**washingtoni** Ckll.

86. The pubescence quite uniformly fulvous or reddish ochraceous.....87.

The pubescence paler, some shade of light ochraceous, gray or white.....89.

87. The pubescence on head and thorax rather short, reddish brown; the anal fimbria purplish brown.....**radiatula** Ckll.

The pubescence on head moderately long..... 88.

88. Enclosure of metathorax without salient rim, minutely roughened. **pruni** Rob.

Enclosure of metathorax decidedly rugose.....**cormi** Rob.

89. Males.....90.

Females .....98.

90. Head quite large, as wide or wider than thorax, and with cheeks strongly produced back of the eyes .....91.

Head of only moderate width, and with the cheeks normal.....93.

91. Size small (6½ mm.); apical margins of abdominal segments testaceous. **Provancheri** D. T.

Size large (9-11 mm.); apical margins of abdominal segments not testaceous.....92.

92. Pubescence on head and thorax silky grayish white, very copious; an abdomen present only on the first and second segments, very short, most conspicuous on sides.....**mesillae** Ckll.

Pubescence on head and thorax very dense, long, mouse colored; an abdomen thin and sparse, with short black hairs on dorsum of segments 2-5. **perarmata** Ckll.

93. Apical margins of abdominal segments narrowly testaceous.....94.

Apical margins of abdominal segments black or concolorous .....95.

94. The face almost naked, the punctuation fine and quite close. **convexa** Prov.

The pubescence on clypeus long and dense; apex of abdomen with a few gray hairs .....**vestita** Prov.

95. Body quite closely and moderately coarsely punctured; the face nearly bare.....96.

Body less closely and more minutely punctured; the clypeus provided with a more or less dense beard .....97.

96. Wings rather strongly infuscated; length 8-10 mm.....**cratægi** Rob.

Wings hyaline, iridescent; length 7 mm.....**salicis** Rob.

97. Inclosure bounded by rim strongly rugose, the wings hyaline, iridescent. **Mariæ** form **concolor** Rob.

Inclosure defined by impressed line, granular; wings faintly clouded at apex .....**algida** Sm.

98. Enclosure of metathorax with the surface not strongly rugose nor provided with ridges.....99.
Enclosure of metathorax with the surface strongly rugose or at least provided with definite ridges.....102.
99. Anal fimbria brownish or gray.....100.
Anal fimbria fulvous.....101.
100. Head and thorax covered with long gray pubescence; the enclosure microscopically tessellate.....**Birtwelli** Ckll.
Head and thorax covered with yellowish pubescence; the enclosure granular (?).....**convexa** Prov.
101. Head and thorax covered with long white pubescence, the latter almost bare dorsally; the enclosure slightly depressed, not so coarsely sculptured as the integument behind it.....**delta** Vier.
Head and thorax covered with whitish pubescence, tinged above with yellow; the enclosure granular.....**rufosignata** Ckll.
102. The enclosure bounded by a well defined ridge.....103.
The enclosure not bounded by a definite ridge or wall.....104.
103. Pubescence on thorax moderately long; fimbria brownish.
Mariæ form **concolor** Rob.
Pubescence short and feathery; fimbria fulvous.....**nuda** Rob.
104. Smaller species (8 mm.). Apical margins of abdominal segments pale testaceous.....**krigiana** Ckll.
Larger species (10–12 mm.).....105.
105. Surface of enclosure strongly rugose.....106.
Surface of enclosure more or less regularly ridged.....107.
106. The pubescence on head and thorax in female ochraceous, to fulvous in male. Face in front of ocelli striate.....**cratægi** Rob.
The pubescence on head and thorax pale; the face before ocelli smooth, shining and sparsely but definitely punctured.....**heraclei** Rob.
107. Smaller (10 mm.). Enclosure of metathorax provided with small vermiform plications.....**Sigmundi** Ckll.
Larger (12 mm.).....108.
108. Enclosure irregularly subreticulately ridged.....**subcommoda** Ckll.
Enclosure with the basal area finely striate.....**commoda** Sm.
109. Pubescence on abdomen paler, either grayish or fulvous.....110.
Pubescence on abdomen at least in part black.....118.
110. Females.....111.
Males.....113.
111. Larger (13–15 mm.). The abdomen clothed with pale pubescence, which often forms thin apical fasciæ.....**Sayi** Rob.
Smaller (9–10½ mm.).....112.
112. Head and thorax above with pale fulvous pubescence; that on abdomen of the same color, short and thinly scattered, most dense towards apex.
victima Sm.
Head and thorax above with pale whitish yellow pubescence; the abdomen thinly covered with hoary pubescence; fimbria fulvous.
mœsta Sm.
113. Larger (9–12 mm.). Head broader than thorax.....114.
Smaller (8 mm.). Enclosure scarcely rugulose, not margined.....115.

114. Enclosure of metathorax rather coarsely reticulated. Pubescence as in female, only somewhat longer ....**Sayi** Rob.
Abdomen clothed with short scattered pale pubescence, dense and ochraceous at apex .....**brunniventris** Cress.
115. Head without black hairs ....116.
Head provided with black hairs on vertex and about margins of eyes...117.
116. Head subquadrate above, pubescence on face and cheeks long and white. Abdomen shining, with thinly scattered hoary pubescence.
mœsta Sm.
117. Abdomen with the first and second segments clothed above with long whitish hairs, those on remaining segments sparser and confined to the lateral margins.....**frigida** Sm.
Abdomen shining, provided with a thin scattered griseous pubescence and with a few silvery hairs at the extreme tip .....**hirticeps** Sm.
118. Pubescence on abdomen entirely black.....119.
Pubescence on basal half of abdomen whitish, on apical half black, that on thorax rufescent.....**impuncta** Kby.
119. Hair on sides of face, about eyes, and on vertex pale; 2nd and 3rd submarginal cells subequal; abdomen with short dark pubescence.
vicinifermis Rob.
Hair on face, vertex and cheeks black, on sides of face and occiput pale; on pleura black; area of metathorax roughened, not plicate.
pluvialis Ckll.
Hair on sides of face, front and cheeks black; 2nd and 3rd submarginal cells markedly unequal..... .....**carlini** Ckll.
Hair on face wholly black, area more coarsely rugulose than preceding. The pubescence on thoracic dorsum brighter, more fulvous.
anogræ Ckll.
120. Pubescence quite long, dense and copious throughout; erect or scarcely decumbent, even on abdomen where forming bands.....121.
Pubescence on abdomen rather short, and for the most part decumbent, at least when forming bands.....126.
121. Entire pubescence golden yellow, that on all segments forming complete bands .....**auricoma** Sm. ♂.
Pubescence variable in color..... .....122.
122. That on thorax and scutellum above bright orange red.
chromatricha Ckll.
That on thorax and scutellum above pale yellow or ochraceous.....123.
123. Anal fimbria yellowish or reddish.....124.
Anal fimbria fuscous or black..... .....125.
124. Pubescence on thorax lemon yellow, on abdomen pale ochraceous; anal fimbria fulvous .....**permitis** Cress.
Larger (12½ mm.). Pubescence on thorax pale yellow, whitish on abdomen, anal fimbria yellowish .....**mentzeliæ** Ckll.
Smaller (♀ 8, ♂ 7½ mm.). Pubescence long, yellow ochraceous, forming bands on apical margins of abdominal segment; anal fimbria ochraceous.....**miserabilis** Prov.
125. Pubescence lemon yellow, that on apex of abdomen mostly black.
hirticincta Prov.

Pubescence cream colored, on the middle and hind tibiæ pale; facial quadrangle about as broad as long; fimbria fuscous. **apacheorum** Ckll.

Pubescence ochraceous, that on middle and hind tibiæ dark fuscous; facial quadrangle a little broader than long; fimbria fuscous. **americana** D. T.

126. Insects rather small, less than 8 mm. in length .....127.

Insects larger, 8 mm. or more in length .....144.

127. Females .....128.

Males .....135.

128. Anal fimbria white or whitish.....129.

Anal fimbria ochraceous, fulvous or fuscous.....131.

129. Head and thorax clothed with pale yellow pubescence. Wings hyaline, the nervures brown. Stigma pale and surrounded by a brown line. **canadensis** D. T.

Head and thorax clothed with rather long grayish white pubescence. Wings with the stigma light brown.....130.

130. Abdomen with complete dense bands of white pubescence. **albovirgata** Ckll.

Abdomen with the hair bands on segments 1 and 2 interrupted. **primulifrons** Casad.

131. Fimbria ochraceous; the pubescence long and of the same color. Wings yellowish-hyaline, iridescent, faintly dusky at tips and with the nervures and stigma honey-yellow .....**miserabilis** Cress.

Fimbria fulvous or subfuscous.....132.

132. Wings with their apices decidedly clouded .....133.

Wings with their apices not clouded .....134.

133. Area at base of metathorax large, coarsely reticulated. **Robertsonii** D. T.

Area at base of metathorax not especially large, shortly rugose at base. **nebecula** Sm.

134. Area at base of metathorax bounded by an impressed line, finely roughened. Cheeks rather strongly produced behind the eyes. **nothoscordi** Rob.

Area of base of metathorax hardly at all defined, roughened. **melanochroa** Ckll.

135. Wings distinctly clouded apically.....135.

Wings hyaline, their apices not at all clouded or infuscated.....140.

136. Inclosure of metathorax finely roughened, more coarsely so at the base. Apical margins of abdominal segments pale testaceous, the hair bands white, very thin.....**nebecula** Sm.

Inclosure of metathorax rather coarsely and longitudinally reticulate..137.

137. Pubescence of head and thorax fulvous.....138.

Pubescence on head and thorax ochraceous; that on apical margins of segments 2-4 also ochraceous. Wings yellowish-hyaline, iridescent. **miserabilis** Cress.

138. Fasciæ on abdominal segments 3 and 4 continuous. Inclosure bounded by a raised rim .....**rugosa** Rob.

Fasciæ on abdominal segments 2 to 4 interrupted. Inclosure poorly defined laterally, but terminating in a sharp edge at truncation.....139.

139. Metathorax on each side of inclosure coarsely reticulated and nearly bare, nervures and stigma dark.....**obscura** Rob.
Metathorax on each side of inclosure rather finely rugose and closely pubescent.....**hippotes** Rob.
140. Head large; the cheeks broad and more or less angulated behind.....141.
Head of moderate size; the cheeks narrower and less distinctly angulate behind.....142.
141. Cheeks strongly produced behind the eyes and bordered by a carina or ridge. Inclosure of metathorax large and rather coarsely reticulated. **platyparia** Rob.
Cheeks broad, with a rounded angle at point opposite and but a little below middle of eyes. Inclosure of metathorax finely roughened. **geranii** form **maculata** Rob.
142. Inclosure of metathorax rather strongly reticulated. Hair bands on abdomen almost obsolete. Face narrowed below.....**Nasoni** Rob.
Inclosure of metathorax longitudinally striate or ridged.....143.
143. Head and thorax with short, pale, fulvous pubescence. Bands on apex of abdominal segments 2-4, interrupted on 2.....**claytoniæ** Rob.
Head and thorax with long whitish pubescence, especially abundant on clypeus. Eyes wider apart below than above.....**erigeniæ** Rob.
144. Males.....145.
Females.....158.
145. Larger, 10 mm. and over.....146.
Smaller, 7 mm. to 9 mm.....147.
146. Wings clear hyaline, the nervures and stigma brown. Pubescence silky grayish white, long on head and thorax; bands on abdomen at apex of segments, interrupted and poorly defined..**elictrica** Cand. & Ckll.
Wings hyaline, the apex broadly dusky. Pubescence yellow ochraceous, long and dense. Apical margins of segments subtestaceous and furnished with bands of short dense yellowish pubescence. **texana** Cress.
147. Pubescence on head and thorax more or less fulvous or rufous.....148.
Pubescence on head and thorax whitish, ochraceous, or at most brownish white.....151.
148. Wings somewhat infuscated or clouded apically.....149.
Wings hyaline or at most smoky-hyaline.....150.
149. Head and thorax clothed with a thin pale pubescence, inclining to rufous on clypeus and mesonotum. The fasciæ on abdomen interrupted. **hippotes** Rob.
Head and thorax clothed with short fulvous pubescence. Nervures and stigma testaceous.....**Forbesii** Rob.
150. Nervures and stigma very dark brown. Fasciæ on abdominal segments 2-4 orange-rufous, that on 4 entire.....**salicifloris** Ckll.
Nervures and stigma testaceous. Abdominal segments 2 4 with narrow fasciæ, interrupted on 2 and 3.....**spiræana** Rob.
151. Head and thorax with pubescence brownish white. Wings hyaline, the nervures piceous, stigma pale brown, marginal with piceous. Abdomen with interrupted fasciæ.....**Knuthiana** Ckll.
Head and thorax with the pubescence whitish or pale yellow.....152.

152. Head larger, broader than thorax, strongly produced behind the eyes..153.
Head moderate, not strongly produced behind the eyes.....155.
153. Wings smoky-hyaline, tinged brownish, nervures and stigma brown. Mandibles toothed within. Thin hair bands on segments 5 and 6.
platyparia form **occidentalis** Ckll.
Wings hyaline, nervures and stigma honey-yellow. Mandibles long, slender, the extreme base toothed below.....154.
154. Joint 3 of antennæ about equal to 5.....**mandibularis** Rob.
Joint 3 of antennæ about equal to 4 + 5.....**tridens** Rob.
155. Wings hyaline, iridescent, the nervures and stigma testaceous. Abdomen covered above with hairs .....156.
Wings not iridescent, either hyaline or smoky.....157.
156. Inclosure at base of motathorax not margined and scarcely rugulose. Abdominal fasciæ almost obsolete.....**mœsta** Sm.
Inclosure at base of metathorax bounded by an impressed line, rather dull and minutely roughened. Hind margins of segments with thin white hair bands. Antennæ wholly black, moniliform.
monilicornis Ckll.
157. Nervures and stigma pale yellow. Apex of abdominal segments somewhat depressed, testaceous, and more or less covered with pale hair bands.
macilenta Prov.
Nervures and stigma brown or ferruginous.....158.
158. Pubescence on head and thorax long, white or pale yellow. Fasciæ of long white hairs on abdominal segments. Stigma ferruginous.
distans Prov.
Pubescence on head and thorax white, more or less mixed with black on vertex and about antennæ. Stigma very dark brown.
segregans Ckll.
159. Larger, usually 12 or more mm. in length.....160.
Medium, between 10 and 12 mm. in length.....172.
Smaller, between 8 and 10 mm. in length.....193.
160. Stigma of anterior wing abnormally small. Pubescence throughout abundant and of moderately uniform length.....161.
Stigma of anterior wing normal. Pubescence variable.....165.
161. Anal fimbria sooty. Abdominal fasciæ white, that on 1 interrupted, on 2-4 continuous.....**Barberi** Ckll.
Anal fimbria yellowish or fulvous. Abdominal fasciæ more or less ochraceous.....162.
162. Wings milky white, the nervures and stigma dark ferruginous. Abdomen with thin fasciæ on segments 2-4.....**Grænicheri** Ckll.
Wings more or less hyaline.....163.
163. Apical margins of abdominal segments testaceous.....164.
Apical margins of abdominal segments concolorous. Wings smoky, their apical margins clouded, nervures dark ferruginous. Fimbria reddish ochraceous .....**nitidor** Ckll.
164. Wings clear hyaline, the nervures and tegulæ pale testaceous. Fimbria pale fulvous.....**helianthi** Ckll.
Wings fulvo-hyaline, apical margins clouded, nervures testaceous. Fimbria golden-yellow .....**rudbeckiæ** Rob.

165. Pubescence for the most part fox-red, moderately long and dense. Segments 2-4 with apical hair bands of the same color....***vulpicolor** Ckll.
Pubescence fulvous, ochraceous or whitish, of variable length and density .....166.
166. Pubescence on head and thorax more or less fulvous .....167.
Pubescence on head and thorax cinereous or ochraceous.....169.
167. Wings yellowish-hyaline, nervures (except subcostal) and stigma ferruginous. Sides of abdominal segments 2-4 with pubescence on hind margins. Fimbria purplish or fuscous.....**Macgillivrayi** Ckll
Wings subhyaline, with the apex clouded; nervures rufo-testaceous....168.
168. Pubescence on face pale fulvous, darker on thorax. Apical margins of abdominal segments provided laterally with narrow fringe of pale pubescence .....**hilaris** Sm.
Pubescence on thorax fulvous. Abdomen at the sides and towards apex with fine gray pile. Apical margins of segments rufo-testaceous. **perplexa** Sm.
169. Abdomen thinly covered above with hoary pubescence, the apical margins of the segments beneath fringed with the same. Wings hyaline, iridescent .....**mœsta** Sm.
Abdomen provided with well-defined hair bands.....170.
170. Wings clear hyaline, the nervures and stigma brown. Abdominal fasciæ very distinct, all continuous. Fimbria chocolate color. **electrica** Casad. & Ckll.
Wings with the apex clouded.....171.
171. Pubescence on head and thorax short, pale gray. Fimbria orange-fulvous. Wings strongly yellowish basally .....**fracta** Casad. & Ckll.
Pubescence on head and thorax long, dense, cinereous. Fimbria cinereous. Wings hyaline.....**verecunda** Cress.
172. Anal fimbria lighter, white, gray, ochraceous or orange.....173.
Anal fimbria darker, various shades of brown or black, as ferruginous, fulvous, rufous, fuscous, etc.....176.
173. Pubescence on head and thorax brownish ochraceous. Abdomen with patches of grayish white pubescence on sides of segments 2-4. Fimbria reddish-orange.....**salicifloris** Ckll.
Pubescence on head and thorax grayish or cinereous. Abdomen with continuous hair bands .....174.
174. The pubescence thin. Hair bands of abdomen long and thin at margins of segments. Fimbria ochraceous .....**macoupinensis** Rob.
The pubescence dense. Hair bands also quite dense ....175.
175. Smaller, 10 mm. in length. Fimbria whitish. Wings faintly hyaline, tinged with yellowish .....**imitatrix** Cress.
Larger, 11-12 mm. Fimbria cinereous. Wings hyaline, apical margin dusky. **verecunda** Cress.
176. Pubescence at least on head and thorax above fulvous.....177.
Pubescence paler, whitish ochraceous or cinereous .....183.

* The descriptions of a few of these insects are so indefinite as to leave some room for doubt as to just where they should fall in the table. They may therefore be found in other sections also.

177. Faciæ on abdominal segments widely interrupted..... .....178.
Fasciæ on abdominal segments white, more or less complete.....179.
178. Insect clothed on thorax with long dense pubescence. The abdominal fasciæ composed of fulvous hairs. Fimbria dark rufous.
striatifrons Ckll.
Insects thickly clothed on thorax with short pubescence. The abdominal bands composed of whitish hairs, Fimbria fulvous....**rugosa** Rob.
179. Hair band on segment 2 interrupted ....180.
Hair bands on segment 2, as well as on the others, complete .....181.
180. Wings hyaline, nervures and stigma honey-yellow. Fimbria pale fulvous.
claytoniæ Rob.
Wings hyaline, apical margins somewhat clouded, the nervures and stigma testaceous. Fimbria dull ferruginous .....**quintilis** Rob.
181. Anal fimbria dull ferruginous. Pubescence on thorax short and thin.
Forbesii Rob.
Anal fimbria fuscous.....182.
182. Wings fusco-hyaline, apical margins a little clouded, nervures and stigma dull testaceous .....**Cressonii** Rob.
Wings yellowish-hyaline, nervures (except black subcostal) and stigma ferruginous .....**Macgillivrayi** Ckll.
183. Pubescence more or less ochraceous.....184.
Pubescence white or whitish .....190.
184. Abdominal fasciæ reduced to lateral patches.....185.
Abdominal fasciæ more or less complete.....186.
185. The fasciæ in the form of a fringe on the sides of segments 3 and 4. Fimbria fuscous .....**placida** Sm.
The fasciæ in the form of well-marked patches of white hair on the lateral margins of segments 2-4. Also some scattered glistening yellow hairs across middle of 3 and 4. Segment 5 and fimbria fulvous.
grandior Ckll.
186. The fasciæ white..... .....187.
The fasciæ obscure, grayish or yellowish ....188.
187. The pubescence on head and thorax thin and pale ochraceous. Fascia on 2 interrupted. Fimbria fuscous .....**arabis** Rob.
The pubescence long and dense, ochraceous on dorsum of thorax, elsewhere whitish. Fasciæ on 2-4 complete. Fimbria gray-brown.
sapellonis Ckll.
188. The cheeks strongly produced behind the eyes. Mandibles long and slender, toothed below at extreme base. Abdominal segments with obscure fasciæ on their pale testaceous edges. Fimbria fuscous.
mandibularis Rob.
The cheeks normal, not strongly produced behind the eyes.....189.
189. Abdomen with very distinct pale gray hair bands, all continuous. Wings clear hyaline, nervures, stigma and tegulæ brown.
electrica Casad. and Ckll.
Abdomen with dense apical fasciæ of yellowish pubescence on segments 2-4. Wings yellowish-hyaline, nervures, stigma and tegulæ dull honey-yellow.....**violæ** Rob.

190. Abdominal segments 2-4 with pale testaceous margins and thin white hair bands. Fimbria blackish ..... **salicacea** Rob.
Abdominal segments without testaceous margins.....191.
191. Fasciæ all interrupted, dense and white on segments 2-4. Basal nervures of wings somewhat curved..... **semipunctata** Ckll.
Fasciæ more or less complete. Basal nervure normal ... .192.
192. Segments 2-4 with thin fasciæ of white on the broadly depressed apical margins..... **asteris** Rob.
Segments 2-4 normal, their fasciæ snow-white; that on 2 interrupted. **prunifloris** Ckll.
193. Pubescence on head and thorax above darker, more or less fulvous or blackish..... .....194.
Pubescence on head and thorax above pale, more or less white, gray, yellow or ochraceous .....203.
194. Head and thorax with considerable of the pubescence black. Abdominal segments 2-4 with lateral apical bands of white pubescence. Wings smoky .....195.
Head and thorax above with the pubescence chiefly fulvous.....196.
195. Head broad, the cheeks large and shining. Basal joint of hind tarsi narrower than the other. Fimbria silvery gray.....**parnassiæ** Ckll.
Head narrower. Basal joints of hind tarsi broad. Fimbria quite dark dull gray ..... **Peckhami** Ckll.
196. Abdominal fasciæ fulvous..... .....197.
Abdominal fasciæ white or pale .....198.
197. Wings fulvo-hyaline, the nervures, stigma and tegulæ rufotestaceous. Abdomen with silken gloss. Fimbria ferruginous..**fulvipennis** Sm.
Wings yellowish-hyaline, faintly clouded beyond the marginal cell; nervures and stigma honey-yellow. Fimbria brown .....**salicis** Rob.
198. Segments 2 and 3 at the sides with apical pubescence. The margins obscurely rufo-piceous. Fimbria rufo-piceous.....**integra** Sm.
Segments 2-4 with their fasciæ more or less complete.....199.
199. Hair bands dense, moderately wide, interrupted on segment 2..... 200.
Hair bands thin and narrow .....201.
200. Fasciæ white. Fimbria chocolate brown. Wings yellowish, faintly dusky at apex.....**medionitens** Ckll.
Fasciæ ochraceous. Fimbria brownish ochraceous. Wings slightly yellowish, the stigma and nervures largely testaceous .....**pacta** Vier.
201. Apical margins of segments narrowly testaceous. Fimbria fuscous. **scutellata** D. T.
Apical margins of segments concolorous. Fimbria fuscous .....202.
202. Wings hyaline, iridescent, slightly clouded at apex; nervures and stigma ferruginous. Abdominal fasciæ sometimes interrupted on 2 and 3. **miranda** Sm.
Wings hyaline, nervures and stigma testaceous. Abdominal fasciæ interrupted on 2 and 3.....**spiræana** Rob.
203. Thorax with ochraceous pubescence ....204.
Thorax with light yellow or grayish pubescence.....206.
204. Abdominal segments provided with conspicuous white hair bands, interrupted on 1. Wings smoky, nervures dark brown. **clypeonitens** Ckll.

Abdominal segments 2–4 provided with narrow hair bands.....205.

205. Wings hyaline, nervures and stigma testaceous. Fimbria ochraceous. **lauracea** Rob.

Wings subfuscous, the apex faintly clouded, nervures dark brown, stigma slightly paler. Fimbria dark brownish .....**truncata** Vier.

206. Anal fimbria lighter, dirty white, yellowish or pale ochraceous .....207.

Anal fimbria darker, ferruginous-fuscous, fulvous or brownish.....213.

207. Fimbria yellowish or ochraceous. Abdominal segments narrowly testaceous at apex.....208.

Fimbria dirty white. Abdominal segments with their apices only in part testaceous .....209.

208. Apex of abdominal segments provided with narrow fasciæ of white pubescence. Fimbria pale ochraceous. Inclosure bounded by a raised line. rather strongly reticulated .....**Nasonii** Rob.

Apex of abdominal segments with bands of dirty white hairs, interrupted on 2. Fimbria yellowish. Inclosure with very obscure rim, punctured like the part beyond.....**salicinella** Ckll.

209. Wings with the apex quite noticeably smoky. Abdomen with apical bands of long white pubescence, thin on 1, dense on 2-5. **xanthigera** Ckll.

Wings with the apex not noticeable dusky .....210.

210. Wings hyaline, the nervures and stigma pale yellow. Segments 2-4 with more or less complete bands.....211.

Wings hyaline or subhyaline, the nervures brown or fuscous. Tips of abdominal segments not noticeably testaceous.....212.

211. Abdomen black, apical margins of segments markedly testaceous. **macilenta** Sm.

Abdomen pale brown, apical margins not markedly lighter colored. **trizonata** Ashm.

212. Abdominal segments 2–4 with fringe of long white hair, interrupted on 2. Length 9 mm .....**distans** Prov.

Abdominal segments 2-4 with apical fasciæ of dirty white hairs. Length 8 mm.....**aliena** Sm.

213. Fasciæ on abdominal segments incomplete or interrupted in the middle..214.

Fasciæ on abdominal segments at least in part complete.....218.

214. Wings with a decidedly yellowish tinge.....215.

Wings not decidedly yellowish .....216.

215. Abdominal segments 1-4 with lateral hair bands. Fimbria fulvous. **multiplicata** Ckll.

Abdominal segments 2-4 with interrupted fasciæ of sparse white hair. Fimbria brownish..... **atala** Vier.

216. Anal fimbria pale fulvous.....**hippotes** Rob.

Anal fimbria sooty or brownish.....217.

217. Pubescence on thorax above brownish white. Wings with nervures piceous, the stigma pale brown, marginal with piceous. Fimbria dark purplish gray.....**Kauthiana** Ckll.

Pubescence on thorax above pale ochraceous. Wings subfuscous, the apex faintly clouded, the nervures dark brown, stigma slightly paler. Fimbria brownish dark .....**truncata** Vier.

218. Pubescence darker, on cheeks, top of head and thorax, above dull fulvous. Fimbria brownish ..... **beulahensis** Vier.
Pubescence lighter, whitish, yellowish or pale ochraceous ..... 219.
219. Triangle at base of thorax finely roughened or granulated ..... 220.
Triangle at base of thorax rather strongly reticulated or longitudinally plicate or rugose
220. Pubescence on head and thorax grayish yellow. Tips of segments testaceous. Fimbria fulvous ..... **frigida** Sm.
Pubescence on head and thorax white or dull white, without the yellowish tinge ..... 221.
221. Wings yellowish, nervures brownish, the stigma deep honey yellow. Segments 1–4 with broad but very thin apical fasciæ of dull white hairs. **apacheorum** var. *a* Ckll.
Wings smoky or smoky hyaline ..... 222.
222. These members hyaline ..... 223.
These members more or less smoky ..... 224.
223. Nervures and stigma dull testaceous. Head broader than thorax; cheeks broad and rounded. Abdominal fasciæ thin, narrow, whitish, complete ..... **geranii maculata** Rob.
Nervures and stigma dark brown. Head normal. Abdominal fasciæ on segment 1 almost obsolete ..... **segregans** Ckll.
224. Wings faintly clouded apically. Abdominal fasciæ interrupted on segments 1 and 2 ..... **simplex** Sm.
Wings not clouded. Abdominal fasciæ on 1 only interrupted. **solidaginis** Rob.
225. Inclosure with its surface reticulated. Head large, broader than thorax, the cheeks strongly and broadly produced behind the eyes, bordered by a rim ..... **platyparia** Rob.
Inclosure with its surface longitudinally ridged, plicate or striate ..... 226.
226. Pubescence rather long, quite abundant on head and thorax ..... 227.
Pubescence sparse, the thorax above nearly bare. Abdominal segments with apical margins narrowly testaceous and with fasciæ of white hairs on 2–4 ..... 228.
227. Apical margins of abdominal segments 2–4 fringed with white pubescence, anal fimbria slightly fulvous ..... **algida** Sm.
Apical margins of abdominal segments 1–4 fringed rather broadly with dirty white pubescence. Fimbria inclining to fuscous ..... **erigeneæ** Rob.
228. Clypeus smooth, shining and impunctate, except on the sides. Mesothorax with scarcely a trace of punctures ..... **bipunctata** Cress.
Clypeus minutely tessellate and dull all over, with rather sparse shallow punctures. Mesothorax with distinct though shallow and rather sparse punctures ..... **hartfordensis** Ckll.
229.* The prevailing color of entire insect blue or greenish ..... 230.
The prevailing color black, but in some instances the abdomen may be more or less ferruginous ..... 231.
230. Steel-blue, sometimes tinged with dark green; the pubescence mostly pale, male and female ..... **chalybæa** Cress.

This section, as represented in the present table, undoubtedly contains forms that should be referred elsewhere.

Shining blue-black, the pubescence entirely black, female; on cheeks, front, occiput and thoracic dorsum dull white, male .....**Foxii** Ckll.

231. Females .....232.
Males.....237.

232. Head and thorax black. The abdomen rufous or reddish .....233.
Entire insect black .....234.

233. Abdomen ferruginous, with faint indications of apical hair bands on segments 2–4. Flies in spring....**andrenoides** form **bicolor** Rob.
Abdomen mostly orange rufous, practically naked above, except on the apex which is strongly fringed with pale ochraceous hairs. Flies in fall. **pectidis** Ckll.

234. Pubescence throughout black .....**phenax** Ckll.
Pubescence pale, or at most only a few black hairs intermingled with the prevailing light colored ones.....235.

235. Hind margins of abdominal segments furnished with uniform bands of dense, appressed white pubescence, the adjacent bases of the following segments with similar but thinner and narrower bands. **rhodocerata** Ckll.
Hind border of abdominal segments with less conspicuous light hair bands .....236.

236. Smaller (8–9 mm.); the metathorax rather minutely granular; the wings yellowish fuliginous.....**andrenoides** Cress.
Larger (9–10 mm.); the metathorax more rugose, and the wings clearer than the preceding.....**wellesleyana** Ckll.

237. Provided with yellow face marks.....238.
Face wholly black.....241.

238. Clypeus, together with a portion of face, yellowish.....239.
Clypeus alone yellow (7 mm.).....**concinnula** Ckll.

239. Clothed on head and thorax with rather long whitish pubescence, that on abdomen short and sub-erect.....240.
Clothed on head and thorax with fulvous-yellow pubescence (7½ mm.). **nevadensis** Cress.

240. Clypeus somewhat bulging, smaller (8½ mm.).....**andrenoides** Cress.
Clypeus more flattened, larger (9 mm.).....**wellesleyana** Rob.

241. Abdomen furnished with hair bands.....242.
Abdomen without hair bands.....244

242. The head wider than the thorax, face narrowing below, flagellum rufous below .....243.
Head not wider than the thorax. Abdomen clothed with short sub-erect pale pubescence mixed with black, apical margin of each segment with a regular narrow fasciæ of dense white pubescence (10 mm.). **regularis** Cress.

243. Larger (8–9 mm.); tarsi ferruginous, the wings sligtly dusky toward apex. **rhodocerata** Ckll.
Smaller (7–7½ mm.); legs wholly black, wings with the apex dusky hyaline and slightly milky.....**oliviæ** Ckll.

244. Smaller (6½ mm.); wings hyaline, slightly dusky at tips. **nigrifrons** Cress.
Larger (8 mm.); wings perfectly clear.....**enochi** Ckll.

The following normally three-celled species are also occasionally found in which one or both wings have but two submarginal cells: *bipunctata*, *claytoniæ*, *hippotes*, *platyparia*, *robertsonii*, *solidaginis*, *personata*, *asteris*, *krigiana*, *milwaukeensis*, etc.

Since this table was finished, Dr. S. Graenicher, of Milwaukee, Wisconsin, has published a paper in the *Canadian Entomologist* (June, 1903, pp. 162–166), in which five additional species are described. As a remodelling of the table at this time is impracticable, it may suffice to indicate briefly where these new forms would fall:

The species *thaspii* Graen., ♀, will come in the vicinity of *frigida* Sm., or *lauracea* Rob., both of which it resembles in some respects. *Cockerelli* Graen., ♀, comes nearest *macoupinensis* Rob., from which it differs by having the facial foveæ black instead of pale, and the fimbria purplish instead of ochraceous. The male of *Cockerelli* may be compared with *perarmata* ♂, but lacks the tooth at base of mandibles of the latter. *Milwaukeensis* Graen, ♀, is nearest to *impuncta* Kby., but differs from it by having the pubescence on two basal segments of abdomen ochraceous to fulvous, instead of whitish. The male of this species has the pubescence entirely fulvous, and the head extremely broad. The *viburnella* Graen., ♀, will fall in the vicinity of *rufosignata* Ckll., and his *albofoveata* ♀ seems to come near *platyparia* Rob., and *hartfordensis* Ckll.

STUDIES IN AMERICAN BLATTIDÆ.

BY JAMES A. G. REHN.
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The following notes are the results of an examination of all the undetermined American Blattidæ in the collection of the Academy of Natural Sciences of Philadelphia, and a large amount of material from the United States National Museum. The latter consisted chiefly of the Schild and Burgdorf collection from Costa Rica, and the Palmer and Riley collection from Cuba.

The collections of the two institutions are indicated in the following pages by their respective initials.

The author is indebted to Mr. W. H. Ashmead of the U. S. National Museum for the privilege of studying the material belonging to that institution.

Subfamily ECTOBIINÆ.

Genus **ANAPLECTA** Burmeister.

1838, *Anaplecta* Burmeister, Handb. d. Ent., Bd. ii, p. 494. Included *A. minutissima* (De Geer), *lateralis* Burm.; *dorsalis* Burm., and *unicolor* Burm.

Anaplecta flabellata Saussure and Zehntner.

1893, *Anaplecta flabellata* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 29. [Teapa, Tabasco, Mexico; Chacoj, Vera Paz, Guatemala; Bugaba, Panama.]

Two females; Tucurrique and Piedras Negras, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

These specimens belong to the pale form of the species, which has the anal field of the tegmina unclouded and the median transverse bar but slightly marked.

Anaplecta fulgida Saussure.

1862. *A*[*naplecta*] *fulgida* Saussure, Revue et Magasin de Zoologie, 2e ser., xiv, p. 163. [Guatemala.]

One male; Piedras Negras, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

This specimen considerably extends the range of the species, Capetillo, Guatemala, being the most southern locality previously recorded.

Subfamily PSEUDOMOPINÆ (*Phyllodrominæ* Auct.).*

Genus **PSEUDOMOPS** Serville.

1831, *Pseudomops* Serville, Ann. Sci. Nat., xxii, p. 41. Type—*Blatta oblongaat* Linnæus.

Pseudomops oblongata (Linnæus).

1758, [*Blatta*] *oblongata* Linnæus, Syst. Nat., x ed., p. 425. ["America."]

Two females; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

These individuals are almost identical with specimens from Cuernavaca, Mexico.

Pseudomops discoidalis (Burmeister).

1838, *Bl*[*atta*] *discoidalis* Burmeister, Handb. der Entom., Bd. ii, p. 498. [Mexico.]

One female; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

This specimen is identical with one from Orizaba, Vera Cruz, except that the tegmina are more blackish.

Pseudomops crinicornis (Burmeister).

1838, *Th*[*yrsocera*] *crinicornis* Burmeister, Handb. der Entom., Bd. ii, p 499. [Para, Brazil.[

One female; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Pseudomops grata n. sp.

Type: ♂; San Carlos, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6933, U. S. N. M.]

Apparently allied to *P. aurantiaca* (Saussure and Zehntner), but differing in the larger size, the longer pronotum and different coloration.

General form elongate, graceful; surface glabrous. Head with the interspace between the eyes but slightly less than that between the antennal bases, and considerably exceeding the long diameter of the eye; eyes subovate, moderately conspicuous; antennæ elongate, considerably exceeding the body, heavily plumose in the basal third. Pronotum rather elongate, the posterior width much greater than the anterior; anterior margin truncate, posterior very obtuse angulate, lateral margins expanding posteriorly. Tegmina elongate; anterior margin moderately sinuate, apex rounded; costal nervures numerous (about 13), basal field narrow; discoidal field with the veins longitudinal and seldom forked;

* As a new subfamily name is required for this group I propose the above, based on the oldest genus.

anal field elongate pyriform, the anal sulcus being gently curved. Wings narrow, sub-acuminate; anterior ulnar vein with two branches which originate at or before the middle of the vein. Supra-anal plate produced, at the base expanded into lateral plates which extend over and embrace the bases of the cerci, the central portion extended and apically rotundate. Subgenital plate broad, spoon-shaped, the apex moderately emarginate. Cerci rather long, depressed, acuminate. Anterior femora equalling the coxæ in length, inferior margin in the apical half closely set with spines; tibiæ with the spines on the superior margin distributed in two rows, 2 exterior, 3 interior; metatarsi but slightly shorter than the remaining tarsal joints. Posterior femora slightly shorter than the tibiæ; tibiæ with the spines of the upper surface in three rows; metatarsi half again as long as the remaining joints of the tarsi.

General color pale orange and black. Head orange red; eyes chestnut; palpi black; antennæ with the basal plumose section black, then a band of dull yellow, and the remaining portion black. Pronotum orange red. Tegmina with the basal two-fifths pale orange, the remaining section black. Wings with the portion covered by the light section of the tegmina pale orange, the remainder black, all the tints being weakened by the sub-hyaline character of the wings. Abdomen above black, the supra-anal plate the same color. Under surface orange red; tibiæ, tarsi, apical portions of the femora and apical portions of the anterior coxæ black; trochanters with a blackish spot. Cerci with the basal half black, the apical section yellow.

MEASUREMENTS:

Length of body, ...	14.5 mm.
Length of pronotum, ...	5. "
Greatest width of pronotum, ...	5. "
Length of tegmina, ...	15.5 "
Greatest width of tegmina, ...	3.5 "

Genus **PSEUDOPHYLLODROMIA** Brunner.

1865, *Pseudophyllodromia* Brunner, Nouv. Syst. Blatt., p. 111. Type—*P. ornata* Brunner.

Pseudophyllodromia fasciatella Saussure.

1868, *Pseudophyllodromia fasciatella* Saussure, Revue et Magasin de Zoologie, 2e ser., xx, p. 99. [Surinam.]

Seventeen specimens; twelve males, five females; Bartica, British Guiana. April 9–May 23, 1901. (R. J. Crew.) [A. N. S. Phila.]

This series is very uniform in size and coloration.

Pseudophyllodromia peruana (Saussure).

1864, *Bl[atta] Peruana* Saussure, Revue et Magasin de Zoologie, 2e ser., xvi, p. 311. [Peru.]

One male; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

While agreeing very well in structure with Saussure's description,

this specimen exhibits what appears to be a singular color pattern, which might warrant description.

General color sienna. Head with the eyes and the interspace between the same wood brown; ventral aspect of head dull yellowish; antennæ with the first and second joints yellowish, the remainder black, the two colors gradually merging. Pronotum pale yellowish, marked with two large longitudinal blotches of blackish brown which flank the median bar of the basic color, these being reinforced laterally by a single narrow line of the same tint; lateral lobes pellucid. Tegmina with the basal field, the interspace between the ulnar vein and anal sulcus, and a median space in the anal field pellucid; anterior portion of the marginal field much lighter than the general color and subpellucid. Wings with the costal region infuscate.

Pseudophyllodromia angustata (Latreille).

1811, *Blatta angustata* Latreille, in Humboldt and Bonpland, Rec. d'Observat. de Zoolog., i, p. 146, pl. xv, fig 9. [Houses of Vera Cruz.]

Six specimens; three males, three females; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

This series is very interesting, and justifies Saussure's association of *venosa* with this species as a synonym.* In the Biologia † Saussure and Zehntner tentatively admitted *venosa* as a species, stating that the differential points were that *venosa* has the ulnar vein of the wing with two branches, and the apical margin of the wing is not or only very slightly infuscate, while in *angustata* "the wings are infuscated on the apical margin and have three ulnar branches." The specimens examined have the ulnar vein with two or three branches, and the apical margin is very slightly or very strongly infuscate.

Pseudophyllodromia pavonacea n. sp.

Type: ♂; Bartica, British Guiana. May 21, 1901. (R. J. Crew.) [A. N. S. Phila.]

This species in general form resembles *P. angustata* (Latreille), but the venation of the tegmina and coloration of the disk of the pronotum are quite different, the former resembling *P. fasciatella* and the latter is similar to *P. peruana*. Relationship also exists with *P. obscura* Saussure from Brazil, and *P. semivitrea* Brunner from St. Vincent. From the former it differs in the unmarked pronotum, and from the latter in the more elongate tegmina, the different markings on the pronotum, and the greater interspace between the eyes. No affinity exists with *P. histrio* Saussure or

* Miss. Scient. Mexiq., Orth., p. 44.

† Biol. Cent.-Amer., Orth., i, p. 47.

P. heydeniana (Saussure), and the closest relationship is undoubtedly with *obscura*. The species described from Grenada, *P. albinervis* Brunner, considerably resembles *pavonacea*, but can be imme diately distinguished by the much smaller size.

Size rather large. Head with the interspace between the eyes about half the short diameter of the eye, the interspace between the bases of the antennæ equal to the eye dimension; eyes ovate; antennæ filiform, considerably exceeding the body in length. Pronotum transverse; anterior and posterior margins slightly produced centrally; lateral margins broadly rounded. Tegmina moderately elongate, subequal in width, the apex narrowly rounded; basal field narrow, acuminate; costal nervures fourteen in number; discoidal vein with two apical forks; median vein and its accessory rami parallel with the discoidal; anal field elongate sub-pyriform, containing five nervures, anal sulcus straight for a considerable part of the distal section. Wings rather narrow; costal nervures eleven in number; axillary vein with three additional branches. Subgenital plate acuminate. Cerci short, stout, depressed, and acuminate, supplied with long hairs. Anterior tibiæ considerably shorter than the femora, spines in two rows; metatarsi exceeding the remaining tarsal joints in length. Median tibiæ equalling the femora, spines in three rows; metatarsi half as long again as the remaining tarsal joints. Posterior tibiæ considerably exceeding the femora in length, spines in three rows; metatarsi over twice as long as the remaining articles.

General color wood brown on a base of pale amber color. Head with antennæ plain wood brown. Pronotum pellucid; marked with a median outlined lyrate pattern of black, which carries an additional fine curved black line on the anterior external section, connecting the middle of either arm of the central pattern with its anterior extremity. Tegmina wood brown, the costal, discoidal and anal field finely lined with pellucid; a large rounded spot at the base of the discoidal field is similar in character; basal field pellucid. Wings pellucid, the edge of the costal region suffused with smoky brown. Upper surface of the abdomen reddish brown. Ventral surface including limbs pale brownish, the vicinity of the bases of the spines on the limbs darker brown.

MEASUREMENTS:

Length of body,	12.2.	mm.
Length of pronotum,	3.	"
Width of pronotum,	4.1	"
Length of tegmina,	11.	"
Greatest width or tegmina,	3.	"

Genus **ISCHNOPTERA** Burmeister.

1838. *Ischnoptera* Burmeister, Handb. der Entomologie, ii, p. 500. Included *I. gracilis* Burmeister from the Cape of Good Hope, *I. fumata* Burmeister from Brazil, and *I. morio* Burmeister from Colombia.*

* Brunner (Nouv. Syst. Blatt., p. 136) placed *morio* as a doubtful synonym of *pensylvanica* (De Geer), but on examination of Burmeister's description ("nigra, sublurida; elytris apicem versus fusco-pallidis"), practically nothing is found to warrant such action.

Ischnoptera inæqualis Saussure and Zehntner.

1893, *Ischnoptera inæqualis* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 36, tab. vi, figs, 14–17. [North Mexico and Texas.]

One male; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

This specimen is somewhat smaller than the male measured by Saussure and Zehntner, but otherwise agrees perfectly with their description. This record considerably extends the range of the species.

Ischnoptera rubiginosa Walker.

1868, *Ischnoptera rubiginosa* Walker, Catal. Blatt. Brit. Mus., p. 121. [Santarem, Brazil.]

Two females; Bartica, British Guiana. May 4 and 7, 1901. (R. J. Crew.) [A. N. S. Phila.]

One of the two specimens examined is slightly larger than the other, but both seem referable to Walker's species. They agree perfectly with his description except that the costal stripe on the tegmina instead of extending "to three-fourths of the length," is very much weakened and indistinct beyond the middle.

Ischnoptera consobrina Saussure.

1862, *I[schnoptera] consobrina* Saussure, Revue et Magasin de Zoologie, 2e ser., xiv, p. 170. [No locality.]

One female; Mexico. [U. S. N. M.]

This specimen is considerably smaller than Saussure and Zehntner's measurements, but is clearly referable to this species.

Ischnoptera jamaicana n. sp.

Types: ♂ ♀; Portland, Jamaica (♀), and Jamaica (♂).

Apparently closest allied to *I. divisa* Saussure and Zehntner,* but differing in the much paler coloration, the more elongate pronotum, and the triangular supra-anal plate, With the numerous West Indian species no close relationship appears to exist. This species belongs to the section of the genus with the medio-discoidal area not exceeding the medio-ulnar in width.

♀.—Size rather small; form elongate-ovate. Head with the interspace between the eyes very broad, but slightly narrower than that between the ocelli, subequal; eyes elongate pyriform; antennæ slightly exceeding the body in length; lower portion of face somewhat flattened. Pronotum subtrigonal in outline; anterior margin truncate, posterior margin very broadly rounded, postero-lateral angles

* Biol. Cent.-Amer., Orth., i, p. 40.

rounded; lateral sections strongly deflected, the margins being straight and distinctly corded; upper surface plane, moderately polished. Tegmina elongate, considerably surpassing the abdomen, the greatest width proximal, sutural margin straight; apex sub-acuminate; basal field narrow, slightly exceeding one-fourth of the tegmina in length; anal field acuminate pyriform in outline, anal vein but slightly curved distally. Wings with the costal veins uncurved; ulnar vein bearing three complete and two incomplete rami. Supra-anal plate triangular, exceeding the subgenital plate in length, apex divided. Subgenital plate produced, rounded, broadly notched apically. Anterior femora armed on the anterior margins with four large median spines, the apical section with a series of small spines; posterior margins with two large and two medium spines on the distal portion. Median femora with eight regularly distributed medium-sized spines on the anterior margins, and several small and medium-sized spines irregularly distributed on the posterior borders. Posterior femora armed with five spines on the anterior and four spines on the posterior margins, those on the latter being placed distally.

♂.—Supra-anal plate triangular in outline, the apex rounded. Subgenital plate transverse, somewhat produced centrally and notched; styles short. Cerci elongate, acuminate, somewhat depressed.

General color yellowish brown. Eyes black; antennæ red-brown; margins of the pronotum pellucid. Upper surface of the abdomen blackish brown, strongest laterally, the entire lateral margins being yellowish white.

MEASUREMENTS:

Length of body,	10.	mm.
Length of pronotum,	2.9	"
Greatest width of pronotum,	3.7	"
Length of tegmina,	11.	"
Greatest width of tegmina,	3.7	"

Ischnoptera sp.

Three specimens; one male, two females; Cabanas, Pinar del Rio, Cuba. (Palmer and Riley.) [U. S. N. M.]

These specimens are so badly broken it is impossible to positively determine them. They appear to approach *blattoides* (Saussure), but differ in wing characters. No relationship exists with any of the other species previously recorded from Cuba.

Genus **BLATTELLA** Caudell.

1839, *Phyllodromia* Serville, Orthopteres, p. 105. [Not of Zetterstedt, 1847.]
1903, *Blattella* Caudell, Proc. Ent. Soc. Wash. v, no. 3, p. 234.

Type.—By elimination and selection, *Blatta germanica* Linnæus.*

It will be seen that the species remaining in the genus are *germanica*, *bivittata*, *supellectilium* and *alternans*. Of these *germanica* can very rationally be selected as the type.

The name *Phyllodromica* Fieber (Lotos, iii, pp. 93–94, 1853), proposed independently, and not as an emendation of *Phyllodromia*, has been generally disregarded. The species he placed in the genus after examination are as follows:

pallida Oliv.,	*Aphlebia* Brunner, 1865.
perspicillaris Herbst.,	*Ectobius* Stephens, 1835.
punctulata Fieb.,	(Congeneric with *perspicillaris*.)
laponica L.,	*Ectobius* Stephens.
sardea Serv.,	*Aphlebia*, 1865.
Megerlei Fieb.,	"
marginata Fabr.,	"
maculata Charp.,	"
decipiens Germ.,	*Polyzosteria* Burm., 1838.
limbata Charp.,	*Kakerlac* Latreille, 1829.

As seen above, *Aphlebia* must give way to *Phyllodromica* Fieber, and of the included species, *punctata* (= *Megerlei*) can well be selected as the type, as Brunner figured this form.

Blattella germanica (Linnæus).

1767. [*Blatta*] *germanica* Linnæus, Syst. Nat., xii ed., p. 688. [Denmark.]

Two specimens; ♂ and ♀; San Jose and Tucurrique, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Blattella nahua (Saussure).

1868, *Blatta nahua* Saussure, Revue et Magasin de Zoologie, 2e ser., xx, p. 355. [Mexico.]

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* The included species of Serville's genus, and the genera into which the eliminated ones were removed are given below.

plicipennis,	
trivittata,	
elongata,	*Ischnoptera*, 1865.
lateralis,	*Pseudomops* (*Thyrsocera*), 1865.
germanica,	
bivittata,	
livida,	*Ectobius*, 1835.
nigrifrons,	*Chorisoneura*, 1865.
laponica,	*Ectobius*.
hemiptera,	*Ectobius*.
sardea,	*Phyllodromica*, 1853.
concolor,	*Ectobius*.
supellectilium,	
alternans	

Two specimens; ♂ and ♀ (latter immature); San Carlos and Turrialba, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

In the female the interspace between the eyes is twice the width of that in the male. The only previous exact records for this species are Atoyac, Vera Cruz and Tabasco, Mexico.

Blattella brunneriana (Saussure).

1868, *Blatta Brunneriana* Saussure, Revue et Magasin de Zoologie, 2e ser., xx, p. 98. [Mexico.]

One male; Piedras Negras, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Blattella titania n. sp.

Type: ♂; Bartica, British Guiana. April 24, 1901. (R. J. Crew.) [A. N. S. Phila.]

Allied to *P. brunneriana* (Saussure), but differing in the larger size, the greater interspace between the eyes (two-thirds instead of about one half of the interspace between the antennal bases), the presence of cross nervures in the anal field of the tegmina, the greater number of branches (five instead of three) to the median vein of the same, and the slenderer limbs.

Size rather large; form elongate ovate; surface polished. Head with the interspace between the eyes about two-thirds that between the antennal bases; eyes acuminate pyriform, somewhat prominent; antennæ exceeding the body by about one-half the length of the latter. Pronotum transverse, subovate; anterior and posterior margins truncate, laterals rounded, the postero-lateral angles being obtuse; disk with a transverse shallow depression before the middle; lateral portions hardly deflected. Tegmina elongate, subequal, apex subacuminate; basal field occupying about one-third the total length; median vein with five distinct rami; anal field pyriform, the five nervures contained therein connected by cross-nervures, spurious longitudinal nervures also present between some of the larger nervures. Wings with the costal veins clavate; ulnar vein with five rami. Supra-anal plate sub-triangular, apex entire. Subgenital plate produced, the apex consisting of a rounded tubercle, flanked by a deep but narrow emargination, the lateral margin terminating at this sinus in the form of a blunt tubercle, the appearance of the whole apex being rather tridentate. Cerci moderately long, acuminate, depressed. Anterior femora bearing three median and one apical large spine and a row of small proximal spines on the anterior, and four spines on the posterior margin. Median femora bearing six spines on the anterior, and four on the posterior margins. Posterior femora with four spines on each margin. Posterior metatarsi over half again as long as the remaining joints combined.

General color ochraceous brown. Eyes rich wood brown; disk of the pronotum reddish ochraceous, the lateral portions and anterior margin pellucid. Upper surface of the abdomen pale blackish-brown, the margins of each segment paler.

MEASUREMENTS:

Length of body,	12. mm.
Length of tegmina,	12.2 "
Greatest width of tegmina,	3.5 "
Length of pronotum,	2.9 "
Greatest width of pronotum,	3.6 "

Blattella delicatula Guérin.

1857, *Blatta* (*Phyllodromia*) *delicatula* Guérin, in La Sagra, Hist. l'Ile de Cuba, Anim. Artic., p. 346. [Cuba.]

Two males; Cabanas, Pinar del Rio, Cuba. May 18 and 21. (Palmer and Riley.) [U. S. N. M.]

Blattella azteca (Saussure and Zehntner).

1893, *Blatta azteca* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 43. [Teapa, Tabasco, Mexico.]

Male and female; El Yunque, Porto Rico (800 feet elev.). February. (C. W. Richmond.) [U. S. N. M.] Jamaica. [A. N. S. Phila.]

This species has only been recorded from the type locality.

The Porto Rican specimen measures as follows:

Length of body,	9.7 mm.
Length of tegmina,	14.5 "
Greatest width of the tegmina (about),	3.2 "
Length of pronotum,	3.5 "
Greatest width of pronotum,	4.5 "

Blattella festæ (Giglio-Tos).

1898, *B*[*latta*] *Festæ* Giglio-Tos, Boll. Mus. Zool. ed Anat. Comp. Torino, xiii, nr. 311, p. 2. [Gualaquiza, Ecuador.]

One male; Venezuela. [A. N. S. Phila.]

This specimen is referred here with some little doubt, as no trace exists of fuscous markings on the tegmina, which are said to be present in *festæ*, otherwise the specimen agrees perfectly with the latter species. This form is related to *B. alaris* (Saussure and Zehntner).*

Blattella pavida n. sp.

Types: ♂ and ♀; Piedras Negras, Costa Rica. (Schild and Burgorf.) [Cat. No. 6934 and 6935, U. S. N. M.]

Allied to *B. vitrea* Brunner,† but differing in the undivided supra-anal plate of the male, the more acuminate character of the same plate in the female, and in the differently shaped costal region of the wing.

* Biol. Cent.-Amer., Orth. i., p. 43.

† Nouv. Syst. Blatt., p. 109, tab. ii., fig. 8.

This species is possibly identical with the form called *vitrea* by Saussure,* which is apparently not the same as Brunner's species. The form here described is very distinct from the latter.

♂. Form medium build, elongate ovate; surface polished. Head with the interspace between the eyes less than that between the ocelli; antennæ moniform, not of great length. Pronotum transverse subovate, the anterior and posterior margins truncate, the laterals with a very broadly rounded angle; lateral portions somewhat depressed. Tegmina elongate, about equalling the wings in length; basal field not exceeding one-third of the tegmina in length, and the greatest width does not exceed one-fifth the total length of the same field; costal nervures numerous, oblique, parallel, becoming interlaced and ramose toward the apex of the tegmina; discoidal field with the veins generally longitudinal in disposition; anal field elongate pyriform, the apex rounded, the anal sulcus meeting the margin of the tegmina at a right angle, veins little curved, subparallel. Wings with the apex narrowly rounded, the anterior field being separated by a comparatively deep emargination; costal region considerably emarginate basally, the costal nervures about ten in number and very slightly enlarged apically; ulnar vein with four rami, the apical one rather indistinct; axillary vein with three rami. Supra-anal plate broadly triangular, apically produced into a superiorly carinate, rostrate process. Subgenital plate triangular, the apical section bent upwards, styles short, clavate. Cerci very considerably surpassing the anal plates, acuminate. Anterior femora with five median and four apical large spines on the anterior lower margin, the intervening space being filled with minute spines. Median femora bearing seven large spines on the anterior margin.

♀. Size medium; form ovate. Basal area of the tegmina broader than in the male, the length being about two-fifths that of the whole tegmen. Wings with the ulnar vein with five rami, the axillary vein with the same number of branches. Supra-anal plate of the same general shape of that structure in the male. Subgenital plate sub-triangular, the apex truncate. Cerci exceeding the anal plates in length, uniform for the greater part of the length, acuminate apically.

General color pale wood-brown, the disk of the pronotum ochraceous brown, the lateral sections of the latter and the basal field of the tegmina sub-hyaline. Eyes blackish brown. Under surface reddish brown.

MEASUREMENTS:	♂	♀
Length of body, ...	12.2 mm.	11.5 mm.
Length of tegmina, . . .	13.5 "	11. "
Greatest width of tegmina, . .	4.5 "	4. "
Length of pronotum, . . .	3.2 "	3.5 "
Greatest width of pronotum, .	4.7 "	4.5 "

Two additional female specimens from the type locality have been examined.

Blattella spectativa n. sp.

Type: ♀; San Carlos, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6936, U. S. N. M.]

* Miss. Scientif. Mex., Orth., p. 30, tab. i, fig. 8.

Allied to *B acolhua* (Saussure),* but differing in the longer tegmina, comparatively shorter anal area of the same, the more numerous costal veins of the wings, the narrowly emarginate supra anal plate, and the different coloration.

Size rather small; form elongate ovate. Head projecting considerably beyond the pronotum, interspace between the eyes wide, about equalling that between the antennal scrobes; eyes depressed. Pronotum transverse, subovate; anterior margin sub-truncate, the posterior distinctly so, the laterals broadly rounded and somewhat depressed. Tegmina elongate, sub-lanceolate, the apex very narrowly rounded; basal field occupying about one-third the length of the tegmen; marginal field with the veins more distinct toward the costal margin; discoidal vein straight and reaching to the apex of the tegmen; anal field equalling one-third the length of the tegmen, sub-pyriform, anal sulcus broadly curved and not sinuate. Wings with the costal veins ten in number. Supra-anal plate broadly triangular, tumid, the apex narrowly and deeply sinuate. Subgenital plate large, produced, the apex rounded and with a sinus which extends back half the length of the plate. Cerci broad, depressed, exceeding the supra-anal plate (broken). Anterior femora with the apical two-thirds of the anterior lower margin finely spinose, the genicular spine slender. Median and posterior femora with the genicular spines slender, the anterior margins with few or no spines. Metatarsi of the posterior limbs not equalling in length the remaining tarsal joints united.

General color wood-brown, the lateral margins of the pronotum, basal and costal sections of the marginal field of the tegmina pellucid. Vein pattern of the tegmina pellucid on the general tint. Eyes blackish brown; interspace between the eyes with three blackish-brown and two creamy-white transverse bars.

MEASUREMENTS:

Length of body,	10.5 mm.
Length of tegmina,	9. "
Greatest width of tegmina,	2.8 "
Length of pronotum,	2.2 "
Greatest width of pronotum,	3.5 "

Subfamily EPILAMPRINÆ.

Genus **PARATROPES** Serville.

1839. *Paratropes* Serville, Orthopteres, p. 117. Type.—*P. lycoides* Serville.

Paratropes biolleyi (Saussure and Zehntner).

1893, *Paratropa biolleyi* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 60. [Costa Rica; Bugaba, Panama.]

Six specimens; three males, three females; San Carlos and Turrialba, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

The variation in coloration in this series is quite interesting. The central black portion of the pronotum in some cases is confluent

* Revue et Magasin de Zoologie, 2e ser., xx, p. 99.

with the front margin, and in others is separated by a very narrow line of pale yellow, which connects the two lateral blotches of the same tint. The tegmina in some cases have the costal margin with a very distinct black edging, while the majority (four) present practically no trace of it. The full development of the black band is noticed in only one individual.

Paratropes sp.

Four immature females; Ateñas and Turrialba, Costa Rica. (Schild and Burgdorf.) [U. S N. M.]

These specimens are too immature to positively determine. The antennæ have a broad annulus of cream, which seems to be absent in the adults of the species examined.

Genus **EPILAMPRA** Burmeister.

1838, *Epilampra* Burmeister, Handb. d. Ent., ii, p. 504. Type.—*E. nebulosa* Burmeister.*

As none have been eliminated from the genus, we may select *nebulosa* as the type, as Brunner has given a good figure of it.

Epilampra azteca Saussure.

1868, *Epilampra azteca* Saussure, Revue et Magasin de Zoologie, 2e ser., xx, p. 356. [Mexico; Cuba.†]

Three specimens; two males, one female; Mexico. [U. S. N. M.]

Epilampra caraibea Saussure and Zehntner.

1893, *Epilampra caraibea* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 65. [Cuba.]

One female; Guanajay, Habana Prov., Cuba. May 5. (Palmer and Riley.) [U. S. N. M.]

This specimen agrees perfectly with the original description, except that the pronotum is a trifle smaller.

Epilampra lucifuga n. sp.

Type: ♀; Southern British Guiana. [A. N. S. Phila.]

Allied to *E. verticalis* Burmeister in tarsal characters, but differ-

* The following are the originally included species:

brasiliensis Burm.	*nebulosa* Burm.
conspersa Burm.	*lurida* Burm.
cribrosa Burm.	*verticalis* Burm.

† The Cuban form has since been removed as *E. caraibea* Saussure and Zehntner.

ing in the much smaller size and very different coloration. The species described by Walker* as *E. arctata* appears to belong to the same group, but has the antennæ as long as the body as well as of a black color. The description is so imperfect that little can be done with it.

Size medium; form ovate Head with the interspace between the eyes equal to that between the ocelli; eyes strongly depressed posteriorly; antennæ exceeding two-thirds the length of the body. Pronotum sub-pentagonal, the dorsum plane and the lateral margins considerably depressed; anterior margin truncate; posterior margin obtuse-angulate; the greatest width posterior to the middle, and twice as wide as the truncate anterior margin. Tegmina elongate, wide, the costal and sutural margins being parallel for tho greater part of the entire length; apex with the sutural margin more emarginate than the costal; basal field equalling one-third of the tegmina in length, narrow; discoidal field with the veins longitudinally disposed; anal sulcus but slightly sinuate, the anal field being elongate, semi-ovoid in shape. Wings with the anterior field narrow, costal veins eight in number, slight, not clavate; anterior ulnar vein with a great number of rami which extend almost to the base of the vein, and become almost parallel to the main vein toward the apex. Abdominal segments with the lateral angles produced into acute spinous processes. Supra-anal plate triangularly produced, the apex narrowly and deeply fissate. Cerci depressed, acuminate, and considerably exceeding the supra-anal plate in length. Subgenital plate very broadly triangular, the apex sub-truncate, the emarginations close to the bases of the cerci broad. Anterior femora with the internal inferior margin with two to five median, one apical and one genicular spine; tarsal joints not equalling the femora in length, the metatarsus not as long as the terminal joint. Median femora with three median spines on the internal and four on the external lower margins; tarsal joints as long as the tibiæ, but not equalling the femora, metatarsus shorter than the other tarsal joints combined, and not quite twice the length of the terminal joint; the lower surface of all the joints, except the terminal joint and a small basal section of the metatarsi, with two longitudinal rows of fine serrations. Posterior femora with three spines on each of the lower margins; tarsi about as long as the femora and about three-fifths the length of the tibiæ; metatarsus equal to the other joints in length; the whole length armed as in the median tarsi, pulvilli small and apical.

General color pale wood-brown, sprinkled with umber. Eyes dark brown, the interspace between the eyes with a transverse arcuate bar of dark brown. Pronotum finely sprinkled with minute specks of the suffusing tint. Tegmina uniformly marked with small indistinct blotches of umber, the median section with four longitudinally disposed small circular dots of this tint. Apical section of the abdomen with a dull indistinct blackish suffusion. Upper surface of the abdomen with the borders of the segments paler than the median section.

MEASUREMENTS:

Length of body, ...	25.5 mm.
Length of pronotum, ...	6. "

* Catal. Blatt. Brit. Mus., p. 74.

Greatest width of pronotum,	7.1	"
Length of tegmina,	22.	"
Greatest width of tegmina,	7.1	"

Epilampra abortivipenna n. sp.

Type: ♀; Bartica, British Guiana. May 9 1901. (R. J. Crew.) [A. N. S. Phila.]

Apparently allied to *E. crassa* Saussure from Mexico, and *E. brevis* Brunner* from St. Vincent; differing from the former in the smaller size, comparatively longer pronotum, the sub-acuminate apex of the tegmina, and in the deeply incised supra-anal plate; from the latter in the different character of the supra-anal plate and the smaller size.

Size medium; form ovate. Head with the interspace between the eyes about equal to that between the ocelli; eyes elongate, pyriform, strongly depressed posteriorly; antennæ not equalling the body in length. Pronotum pentagonal in outline; anterior margin sub-truncate; posterior angle obtuse; lateral portions considerably depressed and with the angles broadly rounded. Tegmina elongate ovate, not equalling the body in length, apex subacuminate, anal sulcus arcuate, very slightly sinuate, anal field less pyriform than usual in the group. Wings short and broad; anterior ulnar vein with rami extending almost to the base. Supra-anal plate triangular, the apex deeply fissate. Cerci exceeding the supra-anal plate in length, somewhat depressed, bluntly acuminate. Subgenital plate slightly produced, rotundate, the apex entire. Anterior femora with the proximal portion of the anterior lower border with five or six large spines, the distal portion with a series of minute spines; tibiæ about three-fourths the length of femora; tarsi with the metatarsus about the length of the remaining joints united, and with its lower surface supplied with two rows of minute denticles. Median femora with the lower surface supplied with three stout spines; tibiæ about equal to the femora in length; metatarsi slightly shorter than the remaining tarsal joints, the lower surface being supplied with two longitudinal denticulate ridges. Posterior femora with the lower margin supplied with three large spines†; tibiæ slightly exceeding the femora in length; metatarsi comprising about three-fifths of the entire length of the tarsi, and supplied on the lower surface with the two denticulate rows present in the metatarsi of the other limbs, pulvilli small and apical.

General color reddish brown, sprinkled with spots of dark umber; pronotum rather uniformly dotted with the deeper color; tegmina with the blotches evenly distributed, the basal section of the principal veins rather strongly marked. Under surface of the body pale ochraceous, the apex of the abdomen reddish brown. Eyes, antennæ and interocular space uniformly blotched with umber.

MEASUREMENTS:

Length of body,	20.	mm.
Length of pronotum,	5.5	"
Greatest width of pronotum,	6.5	"
Length of tegmina,	15.5	"
Greatest width of tegmina,	5.5	"

* Proc. Zool. Soc. London, 1892, p. 203.

† Excluding the apical one, which is rather genicular in character.

Genus **CALOLAMPRA** Saussure.

1893. *Calolampra* Saussure, Societas Entomologica, viii, p. 57. Included *gracilis* Br., *heusseriana* Sauss., *brevitarsis* Sauss., and *bispinosa* Sauss. Of these *gracilis* can be selected as the type, as it stands first and is also based on a figure.

Calolampra hamiltoni n. sp.

Type: ♀; Torquino Peak (5800 feet elev.), Santiago Prov., Cuba. April, 1902. (S. H. Hamilton.) [Acad. N. S. Phila.]

Allied to *C. carinulata* Saussure* from Central America, but differing in the much larger size, the subtruncate posterior margin of the pronotum, the different shape of the tegmina, and in the presence of three spines on the posterior margin of the anterior femora.

Size medium; form obese and elongate elliptical in outline. Head extending somewhat beyond the pronotum; vertex broadly rounded and smooth; interspace between the eyes considerably greater than that between the ocelli; eyes rather small, elongate sub-pyriform in outline; antennæ about equalling half the length of the body. Pronotum sub-triangular in outline, the anterior margin narrow and truncate, posterior margin sub-truncate, very slightly sinuate; latter portion depressed, no distinct shoulder present; entire surface very sparsely cribrose. Tegmina not equalling the pronotum in length, apex emarginate, sutural margins contiguous; basal field equalling one-third the width of the tegmen; vein structure imperfectly developed. Wings developed as small paddle-like blades, completely hidden under the tegmina. Abdomen with the dorsal segments bearing longitudinal scar-like folds rather regularly distributed along the margins; ventral segments without such developments. Supra-anal plate produced, rotundate, sub-scabrose; apex slightly emarginate. Cerci depressed, about equalling the supra-anal plate in length. Subgenital plate very large, not extending beyond the supra-anal plate; apex slightly compressed, margin entire. Anterior femora with three spines on the anterior one subgenicular) and four on the posterior lower margins, genicular spine slender and as long as the tibial spines; tibiæ considerably shorter than the femora; tarsi small and weak, the metatarsi not exceeding the last tarsal joint in length. Median femora with four spines on each lower margin, the apical one on the anterior margin being subgenicular, genicular spine about equal to the femoral and weaker than the tibial spines in size; tibiæ slightly shorter than the femora; metatarsi about equal to the remaining tarsal joints in length, supplied on the lower surface with two longitudinal, closely placed rows of denticles; pulvilli small and apical. Posterior femora with four spines on each lower margin, apical one on the anterior margin subgenicular, genicular spine small and weak; tibiæ slightly exceeding the femora in length; tarsi slender and elongate, metatarsi longer than the remaining tarsal joints, supplied with two longitudinal, parallel and closely placed rows of denticles, pulvilli small and apical.

General colors umber and rufescent. Head with the interocular section, vicinity

* Revue Suisse de Zoologie, iii, fasc. 2, p. 347

of the eyes, labrum and lower portion of clypeus dull ochraceous; eyes gray-brown; face blackish. Pronotum with the median portion blackish, the margins reddish ochraceous speckled with blackish. Tegmina ochraceous closely and evenly speckled with rufescent. Abdomen above gray-brown, closely and densely spotted and blotched with dull blackish brown; ventral surface of abdomen with the median portion of the basal segments gray-brown, the remainder pitch-brown. Limbs dull ochraceous brown marked with umber.

MEASUREMENTS:

Length of body,	21.	mm.
Length of pronotum,	6.	"
Posterior width of pronotum,	8.1	"
Length of tegmina,	5.5	"
Greatest width of tegmina,	5.	"

Three topotypes, all females, have also been examined. One specimen is immature, and has the tegmina and wings undeveloped, but otherwise is much like the type. The coloration varies considerably in the series, but is mainly in the intensity. One specimen is very light and has the characteristic lyrate Epilamproid pattern on the pronotum distinctly visible, while in the type this is hardly discernible.

I have dedicated this species to my friend, Mr. Hamilton, who collected the specimens examined, while attempting the ascent of Torquino.

Calolampra cicatricosa n. sp.

Type: ♀; San Carlos, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6940, U. S. N. M.]

Allied to *C. gracilis* Brunner* from Australia, but differing in the completely hidden head, the punctate front, the broader supra anal plate, the slightly emarginate subgenital plate, the longer metatarsi of the posterior limbs, and in the larger pronotum. Some relationship appears to exist with *C. aptera* Schulthess† from Northeast Africa, which is however a quite different insect.

Size medium; form depressed ovoid, apex anterior; surface finely cribrose. Head completely hidden under the pronotum; interspace between the eyes considerably greater than that between the ocelli; eyes strongly compressed, the greatest depth anterior; antennæ short, not equalling half the length of the body; ventral surface of the head with the surface strongly cribrose. Pronotum produced hemispherical in outline, the anterior margin rounded, the posterior subtruncate, slightly sinuate toward the lateral angles which are rect-acute. Meso- and metanotum with their posterior margins concave, slightly produced

* Nouv. Syst. Blatt., p. 170, tab. iv, fig. 20.

† Ann. Mus. Civ. Stor. Nat. Genova, xxxix, p. 169.

centrally, the lateral angles moderately acute; posterior margins, and also of the pronotum, with a series of longitudinal scars or linear protuberances of an average length of one millimeter. Abdomen strongly depressed; posterior margins of the dorsal segments with scars similar to those on the meso- and metanotum, which become somewhat obsolete toward the apex of the abdomen; ventral segments and subgenital plate supplied with short, erect hairs. Supra-anal plate transverse subrectangulate; posterior margin very broadly arcuate, centrally emarginate to a slight degree. Cerci short, stout, hardly extending beyond the edge of the subgenital plate. Subgenital plate very broad; apex very broadly rounded. Anterior femora with one apical and two basal spines on the anterior inferior border and one apical on the posterior, no genicular spine present; tibiæ very short, not over half the length of the femora; metatarsi about equal to the terminal tarsal joint in length. Median femora with one apical and two small centrally placed spines on the anterior inferior margin, and but one apical spine on the posterior, genicular spine present and larger than any femoral and smaller than the tibial spines; tibiæ about two-thirds the length of the femora; metatarsi but slightly shorter than the remaining tarsal joints. Posterior femora with three or four spines placed in the distal half of the anterior margin, posterior unarmed and without apical spine, genicular spine larger than any femoral and smaller than any tibial spine; metatarsi longer than the remaining tarsal joints, lower surface with two parallel, sub-contiguous rows of minute denticles, pulvilli on the metatarsi very minute and apical.

General color blackish brown and dull ochraceous scrumbled and intermingled, the lateral borders and the median region, flanking a dark median streak, of the latter tint. Eyes dull gray. Ventral surface of the abdomen blackish brown. Limbs reddish brown, darkest on the tibiæ.

MEASUREMENTS:

Total length, ...	19.5 mm.
Length of pronotum, ...	6.5 "
Greatest width of pronotum, ...	9.5 "
Greatest width of abdomen, ...	13.1 "

As the species of the *gracilis*, *aptera*, *cicatricosa* group appear to be closely related, a key for the separation of some might be of interest. All have been examined except *aspera* Tepper and *depolita* Brancsik (Jahresh. Naturwiss. Ver. Trencsén, xix–xx, p. 57, 1898), the latter not being included in the table, as the description is very incomplete and its position uncertain.

A. Head completely hidden under the pronotum.

B. Front glabrous. Metatarsi of posterior limbs about equal in length to the remaining joints of the tarsi. *cicatricosa* Rehn (Costa Rica).

BB. Front punctate. Metatarsi of posterior limbs exceeding in length the remaining joints of the tarsi. *gracilis* Brunner (Australia).

AA. Head not completely hidden under the pronotum.

B. Abdomen granulate. Supra anal plate distinctly emarginate. *aspera* Tepper (Australia).

BB. Abdomen not granulate. Supra anal plate not distinctly emarginate. *aptera* Schulthess (Northeast Africa).

Subfamily BLATTINÆ (*Periplanetinæ* auct.).

Genus **EURYCOTIS** Stal.

1874. *Eurycotis* Stal, Bihang till K. Svenska Vet.-Akad. Handl., ii, no. 13, p. 13. Type.—*Polyzosteria rufovittata* Brunner = *Periplaneta mysteca* Saussure.*

Eurycotis floridana (Walker).

1868, *Periplaneta Floridana* Walker, Catal. Blatt. Brit Mus., p. 135. [St. John's Bluff, East Florida: North America.]

—— *Periplaneta semipicta* Walker, Catal. Blatt. Brit. Mus., p. 141, 1868. [St. John's Bluff, East Florida.]

—— *Platyzosteria ingens* Scudder, Proc. Boston Soc. Nat. Hist., xix, p. 92, 1877. [Fort Reed, Orange Co., Fla.]

—— *Platyzosteria sabalianus* Scudder, Proc. Boston Soc. Nat. Hist., xix, p. 93, 1877. [Sanford, Fla.]

Four females (three immature); El Guama, Pinar del Rio, Cuba. March 5. San Diego de los Banos, Pinar del Rio, Cuba. April 22. 1900. (Palmer and Riley.) [U. S. N. M.]

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* As the name *Platyzosteria* Brunner (Nouv. Syst. Blatt., p 204) has been incorrectly used in relation to *Eurycotis*, I have listed the originally included species of it, and designated the eliminated forms.

melanaria.	
atrata.	
aterrima.	
punctata.	
albomarginata.	
subaptera.	
scabra.	
castanea.	
nitida, . .	*Melanozosteria* Stal, 1874.
rufovittata, .	*Eurycotis* Stal, 1874.
mexicana, . .	"
opaca, . .	"
truncata.	
Novæ-Seelandiæ.	
rufoterminata.	
soror, . .	*Cutilia* Stal, 1877.
ligata, . .	*Cosmozosteria* Stal, 1874.

centrally, the lateral angles moderately acute; posterior margins, and also of the pronotum, with a series of longitudinal scars or linear protuberances of an average length of one millimeter. Abdomen strongly depressed; posterior margins of the dorsal segments with scars similar to those on the meso- and metanotum, which become somewhat obsolete toward the apex of the abdomen; ventral segments and subgenital plate supplied with short, erect hairs. Supra-anal plate transverse subrectangulate; posterior margin very broadly arcuate, centrally emarginate to a slight degree. Cerci short, stout, hardly extending beyond the edge of the subgenital plate. Subgenital plate very broad; apex very broadly rounded. Anterior femora with one apical and two basal spines on the anterior inferior border and one apical on the posterior, no genicular spine present; tibiæ very short, not over half the length of the femora; metatarsi about equal to the terminal tarsal joint in length. Median femora with one apical and two small centrally placed spines on the anterior inferior margin, and but one apical spine on the posterior, genicular spine present and larger than any femoral and smaller than the tibial spines; tibiæ about two-thirds the length of the femora; metatarsi but slightly shorter than the remaining tarsal joints. Posterior femora with three or four spines placed in the distal half of the anterior margin, posterior unarmed and without apical spine, genicular spine larger than any femoral and smaller than any tibial spine; metatarsi longer than the remaining tarsal joints, lower surface with two parallel, sub-contiguous rows of minute denticles, pulvilli on the metatarsi very minute and apical.

General color blackish brown and dull ochraceous scrumbled and intermingled, the lateral borders and the median region, flanking a dark median streak, of the latter tint. Eyes dull gray. Ventral surface of the abdomen blackish brown. Limbs reddish brown, darkest on the tibiæ.

MEASUREMENTS:

Total length,	19.5 mm.
Length of pronotum,	6.5 "
Greatest width of pronotum,	9.5 "
Greatest width of abdomen,	13.1 "

As the species of the *gracilis*, *aptera*, *cicatricosa* group appear to be closely related, a key for the separation of some might be of interest. All have been examined except *aspera* Tepper and *depolita* Brancsik (Jahresh. Naturwiss. Ver. Trencsén, xix–xx, p. 57, 1898), the latter not being included in the table, as the description is very incomplete and its position uncertain.

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AA. Head not completely hidden under the pronotum.

B. Abdomen granulate. Supra anal plate distinctly emarginate. *aspera* Tepper (Australia).

BB. Abdomen not granulate. Supra anal plate not distinctly emarginate. *aptera* Schulthess (Northeast Africa).

Subfamily BLATTINÆ (*Periplanetinæ* auct.).

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Four females (three immature); El Guama, Pinar del Rio, Cuba. March 5. San Diego de los Banos, Pinar del Rio, Cuba. April 22. 1900. (Palmer and Riley.) [U. S. N. M.]

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* As the name *Platyzosteria* Brunner (Nouv. Syst. Blatt., p 204) has been incorrectly used in relation to *Eurycotis*, I have listed the originally included species of it, and designated the eliminated forms.

melanaria.	
atrata.	
aterrima.	
punctata.	
albomarginata.	
subaptera.	
scabra.	
castanea.	
nitida, . .	*Melanozosteria* Stal, 1874.
rufovittata, .	*Eurycotis* Stal, 1874.
mexicana, . .	"
opaca, . .	"
truncata.	
Novæ-Seelandiæ.	
rufoterminata.	
soror, . .	*Cutilia* Stal, 1877.
ligata, . .	*Cosmozosteria* Stal, 1874.

These specimens do not differ from Florida individuals.

The above synonym appears perfectly correct after an examination of Walker's descriptions. The reduction of *sabalianus* has already been proposed by Blatchley,* the name being based on the immature form, in a condition similar to that on which Walker based his *semipicta.*

Eurycotis fischeriana (Saussure).

1872, *P[latyzosteria] fischeriana* Saussure, Mélanges Orthoptérologiques, iv, fasc., p. 111. [Cuba.]

Three immature specimens; one male, two females; San Diego de los Banos, Pinar del Rio, Cuba. April 22, 1900. (Palmer and Riley.) [U. S. N. M.] Torquino Peak, Santiago Prov., Cuba (5800 feet). April, 1902. (S. H. Hamilton.) [A. N. S. Phila.]

One of these specimens is more advanced than the others, being about in the same condition as the specimens described by Saussure. The other two have the black markings of the upper surface broken and confined to two longitudinal series of blotches on the pronotum, mesonotum, metanotum and tegmina, while the abdominal segments are transversely barred with black.

While quite a few nominal species of *Eurycotis* are known from Cuba, it is quite probable that a large amount of material would show several at least to represent immature stages of other forms.

Genus **PELMATOSILPHA** Dohrn.

1887, *Pelmatosilpha* Dohrn, Entomolog. Zeitung, Stettin, xlviii, p. 410. Included *P. praestans* Dohrn and *P. aluris* (Saussure).

Pelmatosilpha coriacea n. sp.

Type: ♀; El Yunque (800 feet elev.), Porto Rico. February. (C. W. Richmond.) [Cat. No. 6939, U. S. N. M.]

Closely allied to *P. marginalis* Brunner † from Grenada, but differing in the broader pronotum, the continuation of the flavous lateral bar on the tegmina, and in the reddish tibiæ and tarsi. As the male only of *marginalis* is known, the abdominal appendages cannot be compared.

Size medium; form depressed, sub-ovoid. Head broad, extending somewhat beyond the pronotum; the interspace between the eyes greater than that between the ocelli; eyes compressed, the median section narrower than either the anterior

* A Nature Wooing, p. 217.

† Proc. Zool. Soc. London, 1893, p. 603.

or posterior portions; antennæ slightly exceeding the body in length. Pronotum sub-triangular in outline, surface moderately polished; anterior margin narrow and truncate; posterior margin truncate; lateral margins forming a right angle with the posterior margin and curving gently forward, meeting the anterior margin at a hardly perceptible angle. Tegmina about one and one-third times the length of the pronotum, surface coriaceous; lateral margins parallel, the apical margins emarginate, the apex sutural; veins not apparent and lost in the general coriaceous mass; anal sulcus evenly curved, apparent only toward the sutural margin, which it joins one-third the length from the apex. Wings not quite equalling the tegmina in length. Abdomen with the lateral margins produced into dentiform processes, strongest posteriorly. Supra-anal plate produced, triangular, tectate; apex rather narrowly rotundate emarginate. Cerci hastate, depressed, slightly exceeding the supra-anal plate in length. Subgenital plate triangular, median ridge prominent, basal portion somewhat depressed. Anterior femora with ten spines on the distal portion of the anterior lower margin, the apical one very large. the posterior margin with four distally placed spines, two apical, genicular spine as long as, but more slender than, the tibial spines; tibiæ about two-thirds the length of the femora; metatarsi about equal to the terminal tarsal joint in length. Median femora with the anterior margin bearing eight evenly disposed spines, the apical one exceeding the others in length, posterior margin bearing six rather even spines, genicular spine of a character similar to that of the anterior limbs; tibiæ slightly shorter than the femora in length; tarsi not quite as long as the tibiæ, metatarsi equal to the terminal joint in length. Posterior femora armed with eight spines on the anterior margin, the apical one slightly exceeding the others in length, posterior margin armed with six spines, genicular spine similar in character to that of the other limbs; tibiæ exceeding the femora in length by about one-third the length of the latter, very stout and robust; metatarsi about equal to the remaining tarsal joints in length, lower surface dentate, pulvilli apical, arolia large.

General color mahogany brown; lateral portions of pronotum and tegmina with a bar of brownish yellow, which on the tegmina is blotched with the general tint. Top of head, labrum and clypeus dull yellowish. Eyes narrowly margined with yellow.

MEASUREMENTS:

Length of body, ...	20. mm.
Length of pronotum, ...	7.2 "
Greatest width of pronotum, ...	10. "
Length of tegmina, ...	10.5 "
Greatest width of tegmina, ...	7.5 "

Genus **PERIPLANETA** Burmeister.

1838, *Periplaneta* Burmeister, Handb. d. Entom., ii, p. 502. Type.—By elimination and selection, *Blatta americana* Linnæus.*

* The original species of *Periplaneta* are as follows:

americana.
brunnea.
ustulata.
Australasiæ.
orientalis, . . *Blatta* restricted by Latreille, 1802.

Periplaneta americana (Linnæus).

1788, [*Blatta*] *americana* Linnæus, Syst. Nat., x ed., p. 424. ["America."]

One male and one female; Luquillo, Porto Rico. March 4, 1900. (C. W. Richmond.) Nuevo Gerona, Isla de Pinos, Cuba. July 1, 1900. (Palmer and Riley.) [U. S. N. M.]

Periplaneta australasiæ (Fabricius).

1793, [*Blatta*] *australasiæ* Fabricius, Ent. Syst., ii, p. 7. ["Capta freqens in nave e mari pacifico & regionibus Australasiæ revertente."]

Eleven specimens; six males (two immature), five females; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.] El Guama, Pinar del Rio, Cuba. March 5. (Palmer and Riley.) [U. S. N. M.] San Diego de los Banos, Pinar del Rio, Cuba. April 22, 1900. (Palmer and Riley.) [U. S. N. M.]

One specimen from San Carlos bears a very great superficial resemblance to *P. americana*.

Subfamily CHORISONEURINÆ.

Genus **CHORISONEURA** Brunner.

1865, *Chorisoneura* Brunner, Nouv. Syst. Blatt., p. 255. Type.—By selection,* *C. nigrifrons* (Serville).

Chorisoneura flavipennis Saussure and Zehntner.

1893, *Chorisoneura flavipennis* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 81. [Atoyac, Vera Cruz, Mexico.]

Three specimens; one male, two females; Turrialba, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

As the female of this species has never been diagnosed, I have appended a description of the same.

Size small; form elongate ovate. Head projecting somewhat beyond the pronotum; interspace between the eyes greater than that between the ocelli; eyes reniform; antennæ reaching to the apex of the tegmina. Pronotum sub-ovate, transverse; anterior and posterior margins rotundate-truncate, lateral margins rounded, the greatest width being posterior; dorsum flat, lateral portions very slightly depressed. Tegmina sub-hastate, apex acute; basal field reaching to the middle of the tegmen, sub-scabrous; discoidal vein practically straight from near the base to the apex, median vein parallel for a greater part the length of the tegmina, median rami comparatively few in number and rather obscure; anal

* The originally included species were:

nigrifrons, *discoidalis*,
flavoantennata, *mysteca*,
sordida.

Of these *nigrifrons* can very rationally be selected as the type, as Brunner gives a figure of this species.

sulcus but little sinuate, the anal field being acute ovoid in shape. Wings with the appendicular field having the angle of insertion obtuse-angulate, coriaceous, apex well rounded; axillary vein biramose. Supra-anal plate transverse subtriangular, apex with a rather broad V-shaped emargination. Cerci elongate, subequal, somewhat depressed, exceeding the subgenital plate by half their length. Subgenital plate large; apex roundly produced, narrowly and deeply fissate; cercal emargination very marked. Limbs with the genicular spine absent on the anterior femora, well developed on the median and posterior pair; metatarsi of the posterior limbs equal to the succeeding tarsal joints in length.

General color warm sienna, darkest on the pronotum, the proximal portion of the tegmina, the lateral margins of the abdominal segments, the cerci and the head. Lateral portions of the pronotum and the basal field of the tegmina pellucid. Eyes blackish brown. Limbs pale.

MEASUREMENTS:

Length of body,	7.5 mm.
Length of pronotum,	2. "
Greatest width of pronotum,	3. "
Length of tegmina,	7.5 "
Greatest width of tegmina,	2.5 "

Genus **PLECTOPTERA** Saussure.

1864, *Plectoptera* Saussure, Mém. l'Hist. Nat. Mexiq., iv, p. 175. Included species *porcellana* and *poeyi;* as the former is figured, it can justly be regarded as the type.

Plectoptera pulicaria Saussure and Zehntner.

1893, *Plectoptera pulicaria* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 86. [Bugaba, Panama.]

Three female specimens; Turrialba, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Plectoptera hastifera n. sp.

Type: ♀; Turrialba, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6938, U. S. N. M.]

Closely allied to *P. pulicaria* and *P. circumdata* Saussure and Zehntner, but differing from the former in the more transparent character of the lateral portions of the pronotum, the slenderer tegmina, more hastate axillary field of the wings, and the different coloration; and from *circumdata* in the smaller size, the much more lanceolate axillary field of the wings, and the different coloration of the pronotum.

Size very small; form ovate; surface polished. Head slightly projecting beyond the pronotum; interspace between the eyes considerably less than that between the antennal bases; eyes compressed reniform, the lower face well hollowed to receive the antennæ, which are moniliform, beset with stiff hairs, and slightly exceeding the body in length. Pronotum transverse, sub-rectangular;

anterior margin truncate, posterior slightly rotundate, lateral margins and the angles rounded; lateral portions somewhat depressed. Tegmina lanceolate, the margins parallel, apex acute; basal field rather narrow, extending to the middle of the tegmina; discoidal vein longitudinal, sending off seven costal veins; median vein parallel with the discoidal for the greater part of its length, sending off several indistinct rami; anal sulcus obsolete, anal field occupied by a number of diagonal broken and indistinct nervures. Wings with the appendicular field very large, acuminate, coriaceous, equal to the remainder of the wing in length, the proximal margin truncate; costal veins five in number; medio-discoidal area subequal in width; axillary vein biramose. Supra-anal plate produced, triangular; apex slightly emarginate. Cerci depressed, sub-spatulate, exceeding the supra-anal plate by half their length. Subgenital plate triangular, produced, acuminate, apex very narrowly fissate. Metatarsi of posterior limbs considerably longer than the remaining tarsal joints. Genicular spines present on only the posterior pair of limbs.

General color dull umber. Eyes blackish. Pronotum with the lateral portions pellucid, the remainder of the tegmina lined and dotted with pellucid, the umber forming two evenly placed blotches of solid color along the sutural margin. Wings with the costal margin blackish brown apically; appendicular field pale umber. Limbs pale.

MEASUREMENTS:

Length of body,	5.1 mm.
Length of pronotum,	1.5 "
Greatest width of pronotum,	2. "
Length of tegmina,	4.9 "
Greatest width of tegmina,	1.7 "

Plectoptera picta Saussure and Zehntner.

1893, *Plectoptera picta* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 85. [Atoyac, Vera Cruz, Mexico.]

One female; Tucurrique, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

This record considerably extends the range of this handsome species, as it was previously known only from the type locality.

Subfamily PANCHLORINÆ.

Genus **LEUCOPHÆA** Brunner.

1865, *Leucophæa* Brunner, Nouv. Syst. Blatt., p. 278. Type.—*Blatta maderæ* Fabricius.*

*The following are the originally included species:

surinamensis,	*Pycnoscelus* Scudder, 1863.
nigra.	
poecila.	
Maderæ.	*Rhyparobia* Krauss, 1892.

As *nigra* and *poecila* are congeneric with *surinamensis*, Krauss' name *Rhyparobia* is superfluous and must fall.

Leucophæa maderæ (Fabricius).

1792, [*Blatta*] *maderæ* Fabricius. Ent. Syst., ii, p. 6. [Madeira.]

Two immature females; Guanajay, Pinar del Rio, Cuba. May 5. (Palmer and Riley.) [U. S. N. M.]

Genus **PELLOBLATTA** n. gen.

Allied to *Leucophæa* (*Rhyparobia* Krauss) and *Pycnoscelus* (*Leucophæa* auct.). From the former it differs in the form of the tegmina and pronotum (which approach *Pycnoscelus*), the great interspace between the eyes, the spine arrangement and the shorter limbs. From the latter it differs in the more distinct venation of the tegmina, the different character of the head, and the divided supra-anal plate.

Pelloblatta lata n. sp.

Type: ♀; San Carlos, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6941, U. S. N. M.]

Size rather small; form ovate; surface of the pronotum polished. Head with the interspace between the eyes about equal to that between the ocelli; eyes elongate reniform, centrally compressed; vertex and lower surface of head glabrous. Pronotum transverse heptagonal *; anterior margin truncate, posterior angle broadly obtuse, the posterior lateral faces very short, the anterior lateral faces as long as the true posterior faces; angles all rounded, the lateral antero-posterior angle the most prominent; lateral portion considerably depressed. Tegmina bluntly ovate, rather broad, venation very distinct, apex rotundato-truncate; basal field moderately wide, reaching to the middle of the tegmen; discoidal vein running comparatively close to the costal margin, sending off about ten distinct costal veins; the ulnar vein, closely following the trend of the anal sulcus, sends off about eight parallel rami toward the apex of the tegmen; anal sulcus arcuate; diagonal vein very deeply and widely impressed. Wings with the apex broadly rounded; costal veins ten in number; ulnar vein bearing eight complete and two incomplete rami. Abdomen with the lateral margins of the dorsal segments slightly produced posteriorly. Supra-anal plate broadly rounded, apex triangularly emarginate. Cerci basally very broad, acuminate, slightly depressed, not equalling the supra-anal plate in length. Subgenital plate very broad, the cercal emargination slight, apex with a very shallow and broad emargination. Limbs moderately robust; arolia rather small.

General color sienna. Eyes blackish brown. Tegmina umber, completely edged with, and lined on the anal sulcus with the general tint. Wings with the costal margin and the apical portion of the anterior field suffused with umber.

MEASUREMENTS:

Length of body, ...	12. mm.
Length of pronotum, ...	4.5 "
Greatest width of pronotum, ...	5.5 "
Length of tegmina, ...	9.5 "
Greatest width of tegmina, ...	4.7 "

* This type is the usual form in this sub-family.

Genus **PYCNOSCELUS** Scudder.

1863, *Pycnoscelus* Scudder, Boston Journ. Nat. Hist., vii, p. 421. Type.—*Pycnoscelus obscurus* Scudder = *Blatta surinamensis* Linnæus.

Pycnoscelus surinamensis (Linnæus).

1758, [*Blatta*] *surinamensis* Linnæus, Syst. Nat., x ed., p. 424. [Surinam.]

Eleven specimens; three females, eight larvæ:

Cuba. (Palmer and Riley.) [U. S. N. M.]

Guanajay, Pinar del Rio, Cuba. April 25. (Palmer and Riley.) [U. S. N. M.]

Habana, Cuba. Aug. 5, 1900. (Palmer and Riley.) [U. S. N. M.]

El Guama, Pinar del Rio, Cuba. April 25. (Palmer and Riley.) [U. S. N. M.]

Cave near Pueblo Viejo, San Juan, Porto Rico. Feb. 17, 1900. (C. W. Richmond and L. Stejneger.) [U. S. N. M.]

Genus **PANCHLORA** Burmeister.

1838, *Panchlora* Burmeister, Handb. d. Entom., ii. p. 506. Type.—By elimination and selection, *P. pulchella* Burmeister.*

Panchlora acolhua Saussure and Zehntner.

1893, *Panchlora acolhua* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 95. [Guerrero, Mexico; Capetillo, Guatemala; Bugaba, Panama.]

Three females; Piedras Negras, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

These specimens belong to the form called *minor* by Saussure and Zehntner.

Panchlora peruana Saussure

1864, *P*[*anchlora*] *peruana* Saussure, Revue et Magasin de Zoologie, 2e ser., xvi, p. 342. [Peru.]

Nine specimens; six males, three females; Piedras Negras, Costa Rica. (Schild and Burgdorf.) Cabanas, Habana Prov., Cuba. May 18, 20 and 21. (Palmer and Riley.) [U. S. N. M.]

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* The originally included species are as follows:

viridis.	
exoleta.	
prasina.	
pulchella.	
surinamensis, ...	*Pycnoscelus* Scudder, 1863.
indica, ...	*Pycnoscelus* Scudder, 1863.
maderæ, ...	*Leucophæa* Brunner, 1865.

Of these *pulchella* can be selected as the type, as Brunner's figure of the genus was based on it.

Panchlora punctum Saussure and Zehntner.

1893, *Panchlora punctum* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 96. [Central America.]

Three females; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.] Venezuela. [A. N. S. Phila.]

One of these specimens, that from Venezuela, differs from the others in the interspace between the eyes being greater.

Panchlora hyalina Saussure.

1862, *P[anchlora] hyalina* Saussure, Revue et Magasin de Zoologie, 2e ser., xiv, p. 231. [Guatemala.]

One female; Adjuntas, Porto Rico. April 12, 1900. (C. W. Richmond.) [U. S. N. M.]

This specimen extends the range of this species considerably to the east.

Genus **ACHROBLATTA** Saussure.

1893, *Achroblatta* Saussure, Societas Entomologica, viii, p. 67. Type.—*A. luteola* (Blanchard.)

Achroblatta luteola (Blanchard).

1846,* *Blatta luteola* Blanchard, in D'Orbigny, Voyage dans l'Ameriq. Mérid., vi, p. 215, pl. xxvi. fig. 3. [Santa Cruz, Bolivia.]

Three females; Carillo, Turrialba and Zarzero, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Genus **ZETOBORA** Burmeister.

1838, *Zetobora* Burmeister, Handb. d. Entom., ii, p. 509. Type.—By elimination and selection, *Zetobora signaticollis* Burmeister.†

Zetobora sublobata Saussure and Zehntner.

1893, *Zetobora sublobata* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 102. [Pantaleon, Guatemala.]

Six specimens; four males, two females; San Carlos, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

Considerable variation in color is exhibited by this series. The reddish brown bar in the lateral section of the anterior margin of the pronotum varies considerably in width.

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* See Sherborn, Ann. and Mag. Nat. Hist., 7th ser.. viii, p. 389.

† The originally included species are as follows:

conspurcata, ...	*Philobora* Brunner, 1865.
conspersa, ...	*Philobora* Brunner, 1865.
signaticollis.	
nimbata, ...	*Phortiæca* Saussure, 1864.
emarginata.	
cicatricosa, ...	*Phortiæca* Saussure, 1864.

Of the two remaining species *signaticollis* may be selected as the type.

Genus CAPUCINA Saussure.

1893, *Capucina* Saussure, Societas Entomologica, viii, p. 67. Type.—*C. cucullata* Saussure.

Capucina cucullata Saussure.

1893, *C[apucina] cucullata* Saussure, Societas Entomologica, viii, p. 67. [Central America.]

Four specimens; two females, two larvæ; Carillo, Costa Rica. (Schild and Burgdorf.) [U. S. N. M.]

As the larva is undescribed, a short description is appended.

Size medium; form elliptical, strongly depressed; surface scabrous. Head completely hidden under the pronotum; interspace between the eyes considerably less than that between the ocelli; eyes elongate, strongly depressed in the median and posterior portions; antennæ not exceeding half the entire length, basal joint very long, third joint not half the length of the first. Pronotum transverse; anterior and lateral margins broadly rotundate; posterior margin obtuse angulate, the apex not rounded, lateral angles rectangulate; center of the disk with a pair of depressed spaces, and a sulcus extending longitudinally through the center of the pro-, meso- and metanotum. Meso- and metanotum with their posterior margin concave, slightly produced centrally. Abdomen with the lateral portions of the dorsal segments produced posteriorly. Supra-anal plate transverse, with the apical portion expanded, lateral angles rounded, apical margin gently arcuate, centrally with a small V-shaped emargination. Cerci short and broad, half as broad as long, greatest width median, acuminate, somewhat depressed, not equalling the supra-anal plate in length. Subgenital plate transverse, somewhat produced, apex very deeply and narrowly fissate, supplied with two short styles. Arolia rather small.

General color wood brown, darkest on the head, center of the pronotum, mesonotum and metanotum, and pair of longitudinal bars which converge posteriorly and meet at the base of the supra-anal plate. The whole surface, whether light or dark, is irregularly and heavily scrumbled with the opposite tint.

MEASUREMENTS:

Total length,	17.	mm.
Greatest breadth,	11.	"
Length of pronotum,	6.	"
Greatest width of pronotum,	10.5	"

Subfamily POLYPHAGINÆ.

Genus HOMŒOGAMIA Burmeister.

1838, *Homœogamia* Burmeister, Handb. der Entom., ii, p. 490. Type.—*Homœogamia mexicana* Burmeister.

Homœogamia sp.

One immature specimen; Buenos Ayres, Argentina. [A. N. S. Phila.]

This specimen is too immature to positively identify, but appears to be related to *H. brasiliana* Saussure.*

* Mém. l'Hist. Nat. Mexiq., iv, p. 228.

Subfamily BLABERINÆ.

Genus **PETASODES** Saussure.

1864, *Petasodes* Saussure, Revue et Magasin de Zoologie, 2e ser.. xvi, p. 349. Type.—*Blatta reflexa* Thunberg.

Petasodes pedestris (Serville).

1839, *Blabera pedestris* Serville, Orthoptéres, p. 83. [Brazil.]

Three females; Jundiahy, Sao Paulo, Brazil. April 12, 1898 and October 9, 1899. (Schrottky.) [A. N. S. Phila.]

Genus **ARCHIMANDRITA** Saussure.

1893. *Archimandrita* Saussure, Societas Entomologica, viii, p. 67. Included species—*marmorata* and *deplanata*.

Archimandrita marmorata (Stoll.)

1813, *B*[*latta*] *marmorata* Stoll, Natuurlijke Afbeeldingen en Beschrijvingen, De Kakkerlakken, pp. 3 and 14. pl. iid, fig. 5.

One male, two females; Colombia. [A. N. S. Phila.] Nicaragua. [U. S. N. M.]

Archimandrita tesselliata n. sp.

Type; ♂; San Carlos, Costa Rica. (Schild and Burgdorf.) [Cat. No. 6941, U. S. N. M.]

Allied to *A. marmorata* (Stoll), but differing in the smaller size and more elongate tegmina.

Size large; form elongate ovate. Head completely hidden under the pronotum; interspace between the eyes but little more than half that between the ocelli, the ocular margins truncate; eyes irregularly reniform, the greatest depth anteriorly; antennæ slightly over half the length of the body, basal joint moderately large. Pronotum transverse ovate, anterior margin evenly arcuate; posterior margin arcuate, but presenting three very blunt and sub-obsolete projections; lateral margins rounded; lateral portions as a whole depressed below the disk of the pronotum. Tegmina ovate, widest in the distal section; apex obtusely rounded; costal and sutural margins very gently arcuate; basal field broad, apparent to beyond the middle of the tegmen; anal sulcus arcuate, the anal field being somewhat elongate hemispherical in shape. Wings elongate, the anterior field very wide, almost equalling the posterior; apex bluntly rounded; ulnar vein bearing eighteen complete rami; posterior field with the apex sub-truncate. Supra-anal plate extensive, transverse, of greater width distally than proximally; the apical margin subtruncate, centrally with a small emargination. Cerci subequal in width, depressed, apex rather blunt, slightly exceeding the supra-anal plate in length. Subgenital plate slightly broader basally than long, apex rotundate, lateral margins emarginate. Anterior femora with three or five median and one apical spine on the anterior margin, posterior margin with one apical spine, no genicular spine present; tibiæ about three-fifths the length of the

form of the supra anal plate is closer to that of *thunbergii* according to his figure. Another consideration in favor of uniting the two names is that the above-mentioned specimens, representing both forms, were taken at the same locality and on the same day.

Genus **BLAPTICA** Stal.

1874, *Blaptica* Stal, Bihang till K. Svenska Vet. Akad. Handlingar, Band 2, no. 13, p. 18. Included species *Blabera claraziana* Saussure, and *Blatta bipustulata* Thunberg. Of these the former can be selected as the type.

Blaptica claraziana (Saussure).

1864, *B[labera] Claraziana* Saussure, Revue et Magasin de Zoologie, 2e ser., xvi, p. 348. [Uruguay.]

Six specimens; three males, three females:
Buenos Aires, Argentina. [A. N. S. Phila.]
Cordoba, Argentina. (Bruner.) [A. N. S. Phila.]
Carcarana, Argentina. (Bruner.) [A. N. S. Phila.]
Rosario, Santa Fé, Argentina. (Bruner.) [A. N. S. Phila.]
Cruz del Eje, Cordoba, Argentina. (Bruner.) [A. N. S. Phila.]

Genus **HEMIBLABERA** Saussure.

1893, *Hemiblabera* Saussure, Societas Entomologica, viii, p. 68. Included species—*H. brunneri* (Saussure), *H. manca* Sauss., *H. capucina* (Sauss.), and *H. granulata* Sauss.

Hemiblabera brunneri (Saussure).

1869, *Blabera Brunneri* Saussure, Revue et Magasin de Zoologie, 2e ser., xxi, p. 113. [Brazil.*]

One female; Nassau, New Providence, Bahamas. 1902. (S. H. Hamilton.) [A. N. S. Phila.]

This is the first record for this species from the Bahaman group.

* This locality is very probably erroneous, as the species has only been recorded from the Antilles since the original description. The unnamed description given by Brunner (Nouv. Syst. Blatt., p. 383) was taken from a specimen from Porto Rico.

NOTES ON NORTH AMERICAN MUTILLIDÆ, WITH DESCRIPTIONS OF NEW SPECIES.

BY AXEL LEONARD MELANDER.

The following notes and descriptions are the result of a study of several collections of North American Mutillidæ. The paper grew from a review of the local forms of Central Texas to its present proportions as the study of the various collections revealed interesting notes. A full list of the species is given in order to supply data for distribution, as in many cases the species were taken from unrecorded localities. Whenever the species was taken in a new State a * has been prefixed to its name. In order to corroborate the identity of the species the larger part of the material has been compared with the excellent type-collection of the American Entomological Society at the Philadelphia Academy of Natural Sciences. By this means the variable species have been assigned their places, and the element of doubt in identifying from descriptions alone the species of so large and difficult a group has been eliminated. Inasmuch as the recent paper by Mr. Wm. J. Fox in these TRANSACTIONS for 1899 gives the best arrangement of our species that paper will be followed, the species listed in the same order, and the notes given may be regarded as supplementary to his revision. Nevertheless, the present writer does not agree in all cases with his scheme of phyletic relationship; *e. g.*, the association of *harmonia* with *waco*, and the divisions *anthophoræ* and *imperialis* are not based on phyletic reasoning, and hence are artificial categories; but in the main the paper is carefully prepared and is of great service to the student. The great variability of certain of the species, and the confusing resemblance of others distantly related have combined to make species definition a hard task, necessitating more lengthy descriptions than Mr. Fox is accustomed to give. Especially in the *Photopsis* group is this to be marked. The abandonment of *Photopsis* by Fox and Dalla Torre is as much an extreme as the erection by others of genera on single characters of certain of these pale-colored and night flying species. It may be remarked that individuals of at least one species, *danaus*, are assignable, some to *Photopsis*, others to *Odontophotopsis*.

Until some experience is gained, the assignment of species to the various groups given by Mr. Fox will often be confusing. Owing to the strenuous way in which the females use their mandibles, the teeth are frequently worn down or quite wanting in old specimens. In these cases care should be noted before a final decision is given that the specimen is a new species in an incongruous group. The differences given on page 221 of Mr. Fox's paper for separating the groups *imperialis* and *anthophoræ* are inversely stated, and should read thus:

First abdominal segment (♀) smaller than second, more or less nodose; in ♂ the first and second segments are not similarly sculptured, the first coarser than the second.....Gr. *imperialis*.

First and second segments (♀) sessile; first segment ♂ not more coarsely sculptured than second.....Gr. *anthophoræ*.

Pygidial structure is sometimes variable within a species, and hence, although generally a good character, cannot be regarded as infallible. In *similima*, for example, the striæ are not uniform, tending to diverge at the tip. *Hippodamia* seems to represent the extreme where the striæ have become transverse, and since as yet no intermediate gradations have been discovered, this form can be given specific rank. The structure of the petiole of the abdomen, the vestiture and sculpture of the body, in fact every single character that can be chosen is subject to greater or less variation. An interesting character which appears to have been unnoticed heretofore is the peculiar plumose structure of the hairs covering the body of certain of the *Photopsis* males. This is often especially noticeable on the abdominal fringes, and recalls the vestiture of the Bees.

In conclusion, I wish to thank the following individuals and institutions who have generously loaned their collections for unlimited study: Rev. G. Birkman, of Fedor, Texas; Mr. Samuel Henshaw, for the Museum of Comparative Zoology, Cambridge, Mass.; Mr. Theo. D. A. Cockerell, for unworked material of his own and belonging to the New Mexico Agricultural College, Mesilla; Mr. C. F. Baker, for the Chicago Academy of Sciences; Dr. O. S. Westcott, of Chicago; and my collaborator, Mr. C. T. Brues, of New York. The types of most of the new species are located in the collections of these gentlemen as indicated at the end of each description.

MUTILLINÆ.

Genus **MUTILLA** Linnæus.

Group *grandiceps.*

1. **Mutilla grandiceps** Blake (1).*

The male and female of this species were found running over a sandy and pebbly slope at Austin, Texas. The ground was occupied by a colony of *Halictus pruinosus* Robertson, which would suggest that this species is possibly parasitic on the bee.

Several specimens, Austin and Fedor, Texas. The upper side of the abdomen varies in color from reddish to black. This species resembles quite closely the ant *Pogonomyrmex* both in color and movements, and not *Atta*, as Mr. Fox states.

Group *canadensis.*

2. **Mutilla nephele** Fox (3).

Several females from Fedor, Texas, October (Birkman).

3. **Mutilla canadensis** Blake (4).

This is apparently the commonest species of Mutilla on this continent, as the collection contains more specimens of this than of any other form. We have examined over one hundred specimens from Massachusetts (July–September), Virginia, and Central Texas (April–June). The occurrence of this species with the same bee with which *grandiceps* associates has been noted in the "Biological Bulletin," June 1903, p. 4.

Specimens from the south are somewhat smaller and of a purer yellow than those from the east. Examples of an almost piceous color are not rare in the Massachusetts series.

4. **Mutilla scævolella** Ckll. and Casad. (5).

One female, Luna, New Mexico (Cockerell).

5. * **Mutilla contumax** Cresson (7).

A single specimen of this ornate species was secured at Austin, Texas, April 28, 1901. This individual differs from the Coloradan type in that the longer hairs of the metathorax, petiole and legs are glistening white instead of ochraceous. The ground color of the second segment is dark rufous, overlaid with black pubescence, while the pubescence of the ⊥⊥-shaped mark is whitish.

* The parenthetical numbers following tne species refer to Mr. Fox's arrangement.

6. **Mutilla donæ-annæ** Ckll. and Fox (9).

One female, Mesilla Park, New Mexico (Cockerell).

7. **Mutilla Wickhami** Ckll. and Casad. (10).

One female, Fedor, Texas (Birkman).

Group *simillima.*

8. **Mutilla montivaga** Cresson (15).

Plate IV, fig. 2; petiole of *brazoria.*

Occurring at Austin and Fedor, Texas, in the variations *montivaga* to *brazoria.* April to October.

9. **Mutilla hippodamia** Fox (16).

Plate IV, fig. 42; pygidium.

One specimen, in a lot of *simillima* collected by the Rev. G. Birkman at Fedor, Texas, apparently belongs to this species. While otherwise closely resembling the variable *simillima*, it is aberrant in the widely diverging striæ of the pygidium and in the rounded sides of the metathorax.

Of the type specimens of this species one has the antennæ red instead of blackish. The pygidium is transversely rugose, and not longitudinally so, as stated in the key (see fig. 42).

10. **Mutilla simillima** Smith (17).

Plate IV. fig. 1; petiole.

Mass., Penna., Va., Ky., Ill., Tex. (M. C. Z., etc.).

The specimens in the Philadelphia Academy of Natural Sciences determined as this species have no black on the venter nor on the second dorsal segment. No hairs arise from the punctures of the abdomen. Specimens from Texas (Fedor, Birkman) are more or less black caudally and ventrally and have very sparse erect abdominal hairs. The species *cætis, hippodamia,* and *simillima* can be quickly separated by the sculpture of the pygidium. In *cætis* the striæ diverge widely, in typical *simillima* they are closely placed and more strictly longitudinal, the only divergence being at the very tip of the median ones; in *hippodamia* the striæ are rugose, straight and transverse. The Massachusetts specimens are considerably smaller as a lot and have the lighter spots of the second abdominal segment round. They are variable in the definiteness of the pygidial sculpture, the striæ of which sometimes are quite

faint. In the Texas specimens the lighter markings of the second segment are larger and quadrate.

One individual from Austin, Texas, exhibits but a single tooth at the middle of the mandibles; and this in view of its similar habitus, would lead one to search for it among the species of the group *anthophoræ*. The lengthened pedicle and first flagellar joints, the carinæ of the lower occiput, the crenulate sides to the metathorax, the strigose metapleuræ, and the sharp, uniform ventral keel, however, are all characters distinctive enough of *simillima* to show the relationship of the Austin specimen to that species.

11. **Mutilla propinqua** Cress. (19).

Nebraska, Texas (M. C. Z.), Mesilla Valley, New Mexico (Cockerell).

12. ***Mutilla oceola** Blake (20).

Several males were taken at Wood's Hole, Mass., during August of last summer, by Mr. Brues. They may possibly be the male of *harmonia* Fox, but they seem to belong to this species. The punctuation of the second abdominal segment is uniform and rather close, the size of the insect is larger and the wings appear to be shorter than in *oceola*.

13. **Mutilla Sanbornii** Blake (21).

The Museum of Comparative Zoology at Cambridge contains a specimen of this species without locality label.

Group *waco*.

14. **Mutilla waco** Blake (25).

Plate IV, fig. 3; petiole.

Not rare. Austin and Fedor, Texas.

15. ***Mutilla harmonia** Fox (26).

Plate IV, fig. 4; petiole.

This species closely resembles *M. cypris* in color. It measures twelve mm. in length. Several specimens were taken at Woods Hole, Mass., during different seasons. Not rare on the sand dunes at Porter, Indiana. The species is not related to *waco*.

Group *asopus.*

16. **Mutilla bexar** Blake (29).

Five specimens, Fedor, Texas, possibly belong to this species. The dorsal groove of the metathorax is filled with reticulations, and the second ventral is simple. Otherwise they agree with the description.

Group *occidentalis.*

17. * **Mutilla gloriosa** Saussure (30).

Plate IV, figs. 5 and 45.

Buckeye, Arizona, one female.

The pygidium is granular in this species.

18. * **Mutilla pseudopappus** Cockerell (31.)

Plate IV, figs. 6 (petiole), and 44 (pygidium).

A single specimen, taken in the Trans-Pecos Region of Western Texas, and another from Mesilla Park, New Mexico.

The pygidium has distinct undulating longitudinal striæ.

19. **Mutilla magna** Cresson 32).

Plate IV, fig. 7; petiole.

Arizona (Westcott); Sinoloa, Mexico (Cockerell).

20. **Mutilla Sackenii** Cresson (33).

Plate IV, fig. 8; petiole of female (*erudita*).

California, Arizona (Westcott).

21. * **Mutilla occidentalis** Linnæus (34).

Plate IV, fig. 9; petiole.

Florida, Mississippi, Arkansas, Tennessee (Westcott); New Jersey, Maryland; West Virginia, Georgia, Florida, Texas, Nebraska (M. C. Z.)

22. **Mutilla comanche** Blake (35).

Plate IV, fig. 10; petiole.

Buena Vista, Colorado (Wickham); Florida (M. C. Z.).

Rev. Mr. Birkman has taken examples both of the typical form and of the variety *clotho* Blake at Fedor, Texas.

23. **Mutilla orcus** Cresson (36)

Plate IV, fig. 11; petiole.

Fedor, Austin, Cuero, and Laredo, Texas; Mesilla, Organ Mountains, Las Cruces, Albuquerque, Socona, New Mexico.

Not rare, both males and females occurring commonly.

Leda Blake is not distinct from this form.

24. * **Mutilla creusa** Cresson (37).

Plate IV, fig. 12; petiole of *medea*.

Two specimens of the variety *medea* Cress. were taken at Fedor, Texas, May (Birkman), one with the cephalic hairs black, the other bright orange above.

Arizona (Westcott); Las Cruces, Las Vegas, Mesilla Park, White Mountains (6300 feet), New Mexico (Cockerell).

One of Mr. Cockerell's specimens was found in combat with *Microbembex monodonta*. In view of the similar struggles between the bee *Halictus* and *Mutilla canadensis*, which we have observed, it may be surmised that this species (var. *medea*) is a parasite of the Bembecid.

25. **Mutilla ægina** Cresson (39).

Plate IV, fig. 13; petiole.

Rather common, ranging in size from nine to eighteen mm.

Fedor, Austin, Columbus, Texas. (May to September.) New Mexico (M. C. Z.).

26. **Mutilla quadriguttata** Say (42).

Plate IV, fig. 14; petiole of *electra*.

Not rare, occurring as the typical form and the variety *electra* Blake, at Fedor, Austin and Cuero, Texas. (May to October.)

Although inconstant as to color, this species has produced no variety as aberrant as a specimen from Fedor. In this individual the thorax is over one half longer than usual, not constricted above the middle legs nor rounded posteriorly, but is broadly ovate, with the sides subparallel. Otherwise the sculpture and color agree perfectly with typical *quadriguttata*.

27. **Mutilla ferrugata** Fabr. (43 and 66).

Mutilla ferrugata Fabr. ♀.
Mutilla fenestrata Lep. ♂.
Mutilla Lepeletierii Fox.

Plate IV, fig. 15; petiole of female.

Both the males and females are very common.

Woods Hole, Mass.; Colebrook, Conn.; New Hampshire; Maryland; Pennsylvania; Illinois; Nebraska; Kansas; Austin, Texas; Arizona.

It is quite doubtful if *castor* Blake, *macra* Cresson, and *agenor* Fox are valid species. If they are not forms of *ferrugata* the struc-

ture of the petiole of the abdomen is not a character of sufficient importance upon which to base their separation. Even in the collection of the American Entomological Society the species are much confused.

28. **Mutilla vesta** Cresson (44).

Another common species. Woods Hole, Mass., and Austin and Fedor, Texas. April to October.

The color of the erect hairs of the head and of the strongly spined legs varies from red to black. Most of the Eastern specimens differ from the typical *vesta*, although the typical form is found with them also. The following variations seem to be fairly constant, and may be tabulated :

VESTA.—Striæ of pygidium suddenly interrupted apically, the tip smooth and subshining; ventral keel of the first abdominal segment twice toothed, as represented by the figure, and gradually sloping off in front. Texas, Massachusetts. (Fig. 16.)

Var. a.—Striæ of pygidium more or less interrupted, the apical portion opaque and granular; ventral keel of same type, but not angular. Massachusetts.

Var. b.—Striæ of pygidium entire; carina of first ventral segment strong, truncate anteriorly, as in figure 17. Massachusetts.

These three variations can be distinguished from the next variety by the rounded spots of the second dorsal segment, the structure of the petiole, and the finer irregular striæ of the pygidium, which number about fourteen and are confused with numerous shorter striæ.

Var. c.—Striæ of pygidium straight, entire, deep and coarse, numbering not over twelve, without short striæ in the interspaces; ventral keel shaped as in the figure. The lighter spots of the second dorsal segment are confluent. Five specimens, Woods Hole, Mass. Because of its close similarity to the other forms of this exceedingly variable species in form, sculpture and color, it is thought best not to give this insect specific rank. (Fig. 18 ; petiole.)

29. * **Mutilla canella** Blake (46 and 75).

Mutilla canella Blake ♂.

Mutilla rugulosa Fox ♀.

We have one female specimen from Woods Hole, Mass., August, which appears to belong here. The male is not rare at Fedor, Texas. May–June.

30. * **Mutilla cypris** Blake (47).

Plate IV, fig. 19; petiole.

Numerous specimens from Woods Hole and New Bedford, Mass., and from Chicago, Illinois.

31. **Mutilla infensa** Melander and Brues.

M. infensa Mel. and Br., Biol. Bull., 1903, June, p. 24.

Plate IV, fig. 20; petiole.

Head transverse, broadly concave behind, finely and closely punctate, mandibles short, edentate; thorax elongate, sub truncate in front, narrowed behind, rugoso reticulate, the ridges of the meshes of the metathorax not raised except where they meet, scutellar scale prominent; abdomen nearly impunctate, pygidium nearly smooth; legs strongly spined. Ferruginous, legs and apex of the abdomen black, second dorsal with two ovate paler spots, pubescence short, sparse, stiff, dense and black on thorax and base and apex of second segment, elsewhere pale yellow.

Woods Hole, Mass. Found running about on the nests of *Halictus*.

This species differs from *canella* Blake by the broader head, petiolate abdomen and smooth pygidium. From *cariniceps* Fox it is distinct by its partially black pubescence, impunctate second dorsal, and by the pygidial structure.

32. **Mutilla texana** Blake (52).

Plate IV, fig. 22; petiole.

Austin and Waco, Texas, September and October.

33. **Mutilla chlamydata** sp. nov.

Female. Head, thorax, and basal half of the abdomen rufo-piceous, apical half of abdomen and legs piceous black; rugoso-punctate; largely clothed with appressed golden-red pubescence and with stubby erect hairs. Head confluently rugosely punctured, not produced behind the eyes, but rather truncate posteriorly, cheeks with deep, rather distinct punctures which bear comparatively short hairs, clypeus truncate, fringed with brown setæ; scape thick, bent on outer third, provided with deep coarse punctures, its yellow hairs sparse, first flagellar joint but little longer than the second; mandibles short, triangular, blackened; palpi piceous; front and vertex with dense, appressed, golden-red pubescence, and with short, erect, concolorous hairs. Thorax egg-shaped, almost rectangularly rounded to the posterior face of the metathorax, closely and coarsely punctured on the sides, the sculpture above concealed by the dense mat of appressed golden-red pubescence, among which arise the sparse, stubby, golden hairs, the hind face of the metathorax less coarsely punctured; pleuræ, coxæ and femora

with straggling, whitish, longer hairs. Disc of the first segment of the abdomen impunctate dorsally, margined however by setigerous punctures; ventrally the first segment has close, deep punctures, anterior half of the keel obliquely prominent, deeply excised at its middle; seen from above, the petiole is trapezoidal, the anterior angles but little produced, subacute, posteriorly subsessile with the second segment; from the side this incisure is not pronounced; second abdominal segment with subconfluent punctures, its anterior and posterior margins and a median vague line piceous, anteriorly with appressed black pubescence and long, stiff, black hairs, the posterior margin likewise clothed, but the erect hairs are brown and short, elsewhere covered with appressed pubescence and short, stubby hairs concolorous with the vestiture of the thorax but less dense; ground color of remaining segments blackish, the pubescence of the third dorsal black, of the others whitish; the suberect hairs of the venter, tibiæ and tarsi whitish; pygidium formed as in *texana*, with reflexed margin, truncate tip, and longitudinally striate disc, the striæ, however, deep and entire, reaching the entire length of the pygidium.

Length, 9 mm.

Plate IV, fig. 21; petiole.

Several specimens, central Illinois, collected near the town of Bath, on the Illinois River, August, 1899.

While this species would lead to the group (species 42–50) defined by Mr. Fox as having the second segment of the abdomen subsessile with the petiole, and the head comparatively small, yet its general habitus is much more suggestive of *texana* Blake. However, it is quite distinct from that species in the structure of the keel of the first ventral segment, the longer striæ of the pygidium, the shorter third joint to the antennæ, and the denser pubescence of different color. In *texana* the carina ends posteriorly in a distinct tubercle, while the anterior blade is entire; the striæ of the pygidium are weak and abbreviated; and the first flagellar joint is one-half again longer than the second, while the metathorax is less abruptly declivous.

34. **Mutilla obscura** Blake (53 and 70).

Mutilla obscura Blake. ♂.

Mutilla scæcola Blake. ♀.

Plate IV, fig. 26; petiole of male.

The Rev. Mr. Birkman has fortunately been able to associate these two species as sexes of the one form. Both males and females are not rare at Fedor and Austin, Texas. April to June.

Another male was obtained by Dr. Wm. M. Wheeler at Bull Lake, Wyoming. The Museum of Comparative Zoology has both the female and the male from Massachusetts.

35. **Mutilla poecilonota** sp. nov.

Female. Ferruginous. Head subquadrate, but slightly wider than the thorax, the hind angles rounded, the sculpture of the upper surface concealed beneath the dense covering of golden-yellow matted hairs, the erect hairs of the head and thorax short and sparse, yellow, punctures of cheeks strong, clypeal margin lightly crenulate; antennæ pale ferruginous, scape more slender but sculptured and clothed as in *obscura, i. e.*, with uniform, sparse, short hairs and rather coarse punctures; mandibles slender, acute, uniformly bent, black apically, palpi rufopiceous. Thorax broad and truncate in front, due to the expanded dentate humeri, sides of mesothorax parallel, metathorax narrowed, truncate posteriorly; seen from the side, the dorsum presents a convex outline, dorsum coarsely punctured, becoming reticulate posterior to the metathoracic spiracles, the disc of the metathorax, however, smooth and impunctate, sculpture above largely concealed beneath the matted golden-yellow pubescence, pleuræ impunctate except above the middle coxæ. Disc of petiole of abdomen smooth, margins with deep punctures, petiole nodose, strongly constricted from the second segment, apically with a patch of silvery pubescence, its anterior angles dentiform, the ventral keel not deep, convex, entire; disc of second segment with deep subconfluent punctures, those of the under surface more separated and rounded, remaining segments with smaller and denser punctures; the disc of the second segment marked beyond the middle with two rounded patches of sparse whitish appressed hairs, elsewhere with blackish pubescence, the lateral and ventral margins of the second, third, and fourth segments, and the mid-dorsum of the third, fourth, and fifth segments fringed with denser silvery pubescence, hairs of apex of abdomen black; pygidium closely granular. Spines of the legs black, less prominent than in the female of *obscura.*

Length, 8 mm.

Plate IV, fig. 23; petiole.

Described from a single female specimen collected in the Trans-Pecos region of western Texas.

Although agreeing in general with *obscura*, this species is markedly and specifically distinct by the dense vestiture of the head and thorax. The dentiform humeri are also characteristic.

36. **Mutilla Bollii** Fox (55).

Plate IV, fig. 24; petiole.

Not rare. Fedor and Austin, Texas. May to October.

37. * **Mutilla coccineohirta** Blake (56).

One male, Las Cruces, New Mexico (Cockerell).

38. **Mutilla ochracea** Blake (59).

We have seen a male of this species from Nevada.

39. * **Mutilla bioculata** Cresson (60).

Several specimens of this species were taken at Bath, Illinois, by Mr. Brues and myself, during August, 1899. Texas (M. C. Z.)

40. **Mutilla zelaya** Blake (64).

Plate IV, fig. 25; petiole.

Males and females of this were taken at Fedor and at Austin, Texas, April to September.

41. **Mutilla castor** Blake (65).

We have this from Texas (Fedor and Cuero) and from Illinois (Chicago).

42. **Mutilla ageuor** Fox (67).

Three males from almost the type locality differ in the finer punctuation of the body. McHenry, Ill., August.

43. ***Mutilla macra** Cresson (68).

Fedor, Texas, May (Birkman); Kentucky (*hispida*, M. C. Z.); Texas, Massachusetts (*macra*, M. C. Z.). Notice the remarks concerning the last three species under *ferrugata*, No. 27.

44. **Mutilla creon** Blake (72).

Two specimens, Fedor, Texas (Birkman).

45. **Mutilla gibbosa** Say (76).

There is in the Museum of Comparative Zoology a specimen indefinitely labelled Pennsylvania.

46. **Mutilla Foxii** Cockerell (80 and 89a).

Mutilla Foxii Cockerell. ♂.

Mutilla heterochroa Ckll. and Casad. ♀.

Plate IV, fig. 28; petiole of ♂: fig 29; petiole of female.

Not rare, occurring in both sexes at Mesilla, New Mexico (Cockerell).

47. **Mutilla californica** Radoszkowski (86).

Plate IV, fig. 27; petiole.

Colorado (Westcott); Mojave Desert, California (Cockerell).

48. **Mutilla pacifica** Cresson (87).

San Diego, California (H. Hemphill, collection of M. C. Z.).

49. **Mutilla aureola** Cresson (88).

California (collection of M. C. Z.).

50. **Mutilla gorgon** Blake (89).

This is not a rare species, occurring at Fedor, Texas (Birkman).

The so called variety *tisiphone* Blake is strangely constant in presenting the "rubbed appearance." We have it from Fedor, Texas, and from New Mexico. See fig. 30; petiole of abdomen from side.

51. * **Mutilla fulvohirta** Cresson (89b).

Plate IV, fig. 31; petiole. ♂.

Fedor, Texas (Birkman); Colorado (Westcott); Mesilla and Santa Fé, New Mexico (Cockerell); Washington (M. C. Z.). The head is often black and the second abdominal segment may bear orange spots.

Group *pennsylvanica.*

52. * **Mutilla sæva** Blake (90).

Recorded from Massachusetts, in the Museum of Comparative Zoology.

53. **Mutilla Henshawi** sp. nov.

Wholly black, with black and whitish pubescence; mandibles robust bidentate; eyes rounded, facetted, ocelli minute; marginal cell of the blackish wings bluntly pointed.

Male. Uniformly black over all. Head transverse, somewhat wider than the thorax, somewhat produced behind the eyes and obtusely rounded to the nearly straight hind edge, contiguously and rather deeply punctured; clypeus short, broadly emarginate at the middle; eyes prominent, more or less irregularly rounded, anterior ocellus minute, posterior ones rudimentary, represented by two smooth plane areas; antennæ reaching to the middle legs, the scape slightly more than one-half the distance between the eyes, gradually bent at its outer third, closely minutely but deeply punctured and clothed with erect and decumbent black hairs, basal joints of the flagellum, including the pedicel, equal in length, square in outline; hairs of the head erect, blackish, on each side of the vertex, at base of mandibles, and on the occiput whitish. Prothorax with small, deep, dense punctures, those of the mesonotum slightly less closely placed, scutellum finely rugoso-punctured, pleuræ sculptured like the mesonotum, metathorax reticulate, marked with a median line abbreviated in front and behind; the vestiture of the thorax consists of short erect hairs, whitish along the sutures, the tegulæ and the base of the wings, sparse on the metathorax, and blackish elsewhere. Petiole of abdomen somewhat triangular in outline, the front angles dentiform, sessile with the second segment; seen from the side, it is not nodose and scarcely constricted from the second segment, rather closely punctured like the second segment, but the punctures well separated, ventral carina reduced to a small bisetigerous tubercle; remaining segments more finely and densely punctured, ventral segments sculptured like the dorsals, pygidium finely margined, finely rugose. The sparse and erect hairs of the abdomen are dirty white except on the last three dorsal segments, where they are black. Femoral hairs sparse, whitish, tibiæ and tarsi more densely covered with decumbent whitish pubescence, the spines of the hind tibiæ and tarsi reduced setiform. Wings uni-

formly fuliginous except that the second submarginal ends in a subhyaline spot. This continues basally just within the second submarginal as a subhyaline streak, crossing the center of the first submarginal and ending at the base of the stigma. Veins and stigma black, marginal cell longer than the first submarginal, bluntly acuminate, second submarginal shorter than the first, strongly narrowed toward the marginal, receiving the recurrent nervure at the middle. In one specimen the pentagonal third submarginal and the third discoidal are vaguely defined, in the other wholly wanting.

Length, 7.25–10.5 mm.

Two males. Forest Hill, Mass., August 31, 1898 (Samuel Henshaw), and Woods Hole, Mass., August, 1900.

Henshawi is placed with the species of the group *pennsylvanica* because of its rudimental eyes and the neuration of the wing. It is quite different, however, from the other males of the division in the form of the first abdominal segment, which is quite sessile with the second, as in the females. If this character be considered of more importance than the other, the species would be placed in the Western group *anthophoræ* with the species *adonis* Fox, or *thamyras* Fox. From these slender species the new form is obviously far removed.

54. **Mutilla pennsylvanica** Lepeletier (91).

Four specimens from Fedor, Texas (Birkman). May–October.

55. **Mutilla auripilis** Blake (92).

Not rare in Central Texas, occurring at Fedor and Austin.

56. **Mutilla jason** Fox (93).

One specimen taken by the writer at Austin, Texas.

57. **Mutilla balteola** Blake (94).

Plate IV, fig. 32; petiole.

Not rare at Fedor and Austin, Texas. One specimen differs in the reduced white fasciæ of the abdomen; that of the second segment bears no median projection anteriorly.

Group *imperialis*.

The species of this group and of the next are closely related, forming the old genus *Photopsis* of Blake as far as the males are concerned. Were it not for the numerous species here included, it would be well not to attempt to subdivide this group, at least not on the grounds taken. The division into genera, such as *Odontophotopsis*, is equally untenable, as the sexual character chosen from one sex is subject to great variation. For this reason the species

we have seen are grouped together, but some relationship at least is expressed in the following key for the separation of the males. The descriptions of the new species have been interpolated as near to their relatives as is practicable. The number of undescribed forms occurring in the Southwestern States is remarkable. The males are caught mostly at lights which they seek in their nocturnal flights. The females, however, are much more seclusive, and have to be sought for on the hot, arid sand during the day-time.

Mesosternum with a pair of strong projections near its anterior border. (Subgen. **Odontophotopsis** Viereck) 2.

Mesosternum with a pair of crenulate longitudinal ridges, but with no strong tooth anteriorly.....11.

Mesosternum completely unarmed.....(**Photopsis** Blake) 14.

2. The projection of the mesosternum acutely pointed, more or less beak-like and longitudinally placed, though sometimes small; wings hyaline..3.

The projections at most truncate pyramidal, but not pointed, rather transverse; wings with brown clouds.....10.

3. Petiole of abdomen rather nodose, constricted apically, and with stronger punctures than those of the second segment.....4.

Petiole nearly sessile with the second segment, not nodose and nearly impunctate; abdominal segments fringed with plumose hairs.....8.

4. Petiole twice as long as broad, with fine punctures on the disc; all the abdominal segments fringed with strongly plumose white hairs. **Westcottii** sp n.

Petiole shorter and with coarser punctures.....5.

5. Mesonotum with fine scattered punctures.....6.

Mesonotum with close deep punctures, the grooves abbreviated on the anterior half; veins thin, testaceous, wings hyaline.....7.

6. Parapsidal grooves extending nearly the whole length of the notum; veins strong brown, wings tinged with brown.....**pudica** sp. n.

Grooves wanting; wings hyaline, veins testaceous.....**grata** sp. n.

7. All the abdominal segments fringed with plumose hairs; legs and antennæ testaceous; hind ocelli nearer the eyes than each other. **Erebus** sp. n.

Only the second abdominal segment with a fringe of plumose hairs, the remaining vestiture dense and long, however; ocelli nearer each other than the eyes; antennæ and part of femora fuscous. **melicausa** Blake.

8. Abdomen with setigerous punctures, fuscous apically; femora blackened at tip.....**concolor** Cress.

Hairs of abdomen not arising from punctures; smaller species with pale legs.....9.

9. Mesothorax with strong punctures and complete grooves; metathorax reticulated over all above.....**hamata** sp. n.

Mesothorax with shallow punctures and abbreviated grooves; metathorax with elongate basal areas.....**trita** sp. n.

10. Head with weak punctures, petiole of abdomen with strong punctures. **hebes** sp. n.
Head with strong punctures, petiole with weak ones.....**damaus** Blake.
11. Petiole of abdomen nodose, abdomen, legs and antennæ black or blackened.12.
Petiole broader, subsessile; insect rufo-testaceous.....13.
12. Large; wings infumated; second segment of abdomen with deep punctures; hind ocelli nearer the eyes than each other.....**Cockerelli** sp. n.
Small; wings hyaline; second segment nearly impunctate; hind ocelli not nearer the eyes than each other.....**bellerophon** Fox.
13. Punctures of head sparse and deep; abdomen rufo-testaceous, covered with erect pubescence.....**simpliciventris** sp. n.
Punctures of head irregular, becoming confluent between ocelli; second segment of abdomen with a brown pattern, and with decumbent pubescence.....**Wheeleri** sp. n.
14. Petiole of abdomen nodose, sharply constricted at the second segment and strongly punctured.....15.
Petiole sessile or subsessile with the second segment, at most punctulate..20.
15. Reticulum of metathorax comparatively fine.....16.
Reticulum of metathorax coarse.....17.
16. Head, thorax and legs dark, pubescence yellow.....**imperialis** Bl.
Insect and appendages pale, with long white hairs.....**territa** Ckll.
17. Petiole of abdomen slender and nearly impunctate; abdomen dark. **mesillensis** Ckll.
Petiole of abdomen coarsely sculptured; abdomen largely reddish.....18.
18. Mesonotum with shallow punctures and dense hairs; hind ocelli but little farther from each other than from the eyes....**Pattersoni** sp. n.
Mesonotum with deeper punctures and sparse hairs.....19
19. Hind ocelli as far from each other as from the eyes; wings crossed by a fuscous cloud from the stigma.....**damaus** Blake var.
Hind ocelli large, considerably more distant from each other than from the eyes; wings not crossed.....**albicincta** Fox.
20. Petiole of abdomen broadly sessile with the second segment; metathorax [illegible] **noctivaga** sp. n.
Petiole subsessile; metathorax with an enclosed smooth area.....21
21. Basal areas of metathorax very large, occupying nearly the whole segment; insect pale yellow and black.....**arcuatus** Fox.
Basal areas of metathorax extend [illegible] species.....22
22. Head [illegible] **unicolor** Crem.
Head [illegible] **abrupta** Fox.

23. **Mutilla imperialis** Blake.

[illegible] M. C. Z.

24. **Mutilla damaus** Blake.

[illegible]

Las Cruces (September 6th), La Cueva, Organ Mountains (Altitude 5300 ft., at light, September 4th), New Mexico (Cockerell). Another specimen from the Chicago Academy of Science labelled Texas.

60. * **Mutilla bellerophon** Fox (100).

Fig. 59; wing.

Numerous specimens, Austin and Fedor, Texas. The punctuation of the head and abdomen is variable but correlated,—the head punctures are rather fine in some specimens and close in others. When the head is finely punctured the second abdominal segment is smooth, otherwise it is punctulate with scattered punctures. Some specimens have the abdomen rufous. Several distinctive characters of the Texas specimens are obvious and may be noticed: the bi sected area of the metathorax is as long as three areoles; the outer cubital vein is attenuated before and behind, while the inner cubital is evanescent posteriorly; the marginal cell is clouded toward the stigma; and the mesosternum has two crenulate ridges.

61. **Mutilla Cockerelli** sp. nov.

Head, thorax and petiole of abdomen reddish, remainder of abdomen, legs and antennæ black, wings infumated, veins black, coarsely punctured species; mesosternum with small teeth.

Male. Head rounded, broadly so behind the eyes, moderately punctured, clothed with erect, whitish, scattered hairs; ocelli relatively small, the distance between the hind ones three times the diameter of an ocellus and greater than the distance to the eyes; the shallow space in front of the anterior ocellus connected with the posterior edge of the clypeus by a narrow impressed line arising in a deep puncture in front of the ocellus; antennæ wholly black, shorter than the head and thorax, the scape densely punctured and with short, very sparse pubescence. Thorax shining, prothorax confluently punctured, mesothoracic punctures separated, deep, the grooves linear and black, middle ones complete; scutellum rugosely punctured; metanotum reticulate, but not coarsely, basal areas confusedly crenulate transversely, mesopleural punctures strong only in the centre of the bulbous portion; mesosternum with two arcuate and obliquely diverging lines of transverse denticles. Petiole of abdomen nodose, constricted behind, the front angles sharp, strongly and confluently rugoso-punctate, its black hind margin with a scattered white fringe; second abdominal segment strongly punctured, more closely so in front and laterally, its hind margin with a conspicuous white fringe of simple and plumose hairs; remainder of abdomen punctulate, and with a similar white fringe; venter punctured and fringed like the dorsum. Coxæ piceous, legs black, tibial spurs fuscous, hairs silvery white. Wings lightly infumated, stigma black, veins blackish, pubescence black, third submarginal obscure.

Length 10.5 mm.

Fig. 55; mesosternum.

Described from a single male specimen from the collection of Prof. T. D. A. Cockerell, collected by Mr. C. A. Townsend, at Cuero, West Texas, June.

This species resembles *bellerophon* Fox, differing by the shorter and darker antennæ, smaller ocelli, and darker wings. The armature of the mesosternum is also quite different.

62. **Mutilla mesillensis** Cockerell (101).

Las Cruces and Arrogo, New Mexico (Cockerell).

63. **Mutilla grata** sp. nov.

Small, testaceo-rufous, apex of abdomen fuscous, sparsely hairy, head globose, almost impunctate, antennæ longer than head and thorax, mesonotum smooth and shining, metanotum coarsely reticulate, mesosternum with two minute teeth, petiole short, strongly punctured and constricted from the smooth and polished second segment, legs testaceous, wings hyaline, veins pale, two submarginals, the second small.

Male. Testaceo-rufous, vertex blackened, apex of abdomen infuscated, head uniformly rounded and much produced behind the eyes, obsoletely punctulate, its pubescence very sparse, ocelli small, hind ones further from each other than from the eyes, a round, shallow, punctiform depression midway between the antennæ and the front ocellus; clypeus large, shallow, polished, with a prominent Y-shaped ridge in front of the antennæ; mandibles short, strongly bent, not very robust, the tips and the strong basal tooth blackened; antennæ testaceous, scape pale yellow, slender and nearly straight, almost glabrous, antennæ reaching to the base of abdomen. Prothorax shallowly and rugosely punctured, mesonotum smooth, polished, the grooves wanting or indicated posteriorly as a short punctured stria, scutellum finely rugulose, metanotum coarsely but rather shallowly reticulate, the basal areas small, slightly exceeding two areoles; mesopleuræ minutely reticulate towards the coxæ, mesosternum smooth except for the two minute, backward-pointing, acute teeth which are placed rather far back on the segment. Petiole of abdomen one-third longer than broad, and twice as broad at tip as at base, anterior angles dentiform, the hind margin strongly constricted from the second segment, strongly nodose and very coarsely punctured, beneath subcarinate in the middle, the carina terminating abruptly in front; second segment impunctate, polished, beneath very sparsely punctulate, third segment with a V-shaped speculum. Vestiture of thorax and abdomen very sparse, whitish, the second and third segments fringed with short, white, plumose hairs. Legs including the coxæ pale testaceous. Wings hyaline, stigma fuscous, veins yellowish, marginal cell short, second submarginal receiving the recurrent vein at its basal fourth, third submarginal completely wanting.

Length, 5.5 mm.

Fig. 58; wing.

Described from two male specimens collected by Mr. C. H. Townsend, at La Cueva, Organ Mountains, New Mexico, at an altitude of about 5300 feet, at light.

64 **Mutilla pudica** sp. nov.

Slender, pale ferruginous, cephalic punctures scattered, ocelli approximated, mesothorax distantly punctured, grooves distinct, metathorax with long, smooth basal space, pleuræ largely reticulate, first abdominal segment small, nodose, closely punctured, second almost impunctate, mesosternum with a pair of sharp, stout teeth; legs fusco-testaceous; wings yellowish, stigma black, third submarginal open.

Male. Pale ferruginous, apical segments fuscous, ocelli margined with black interiorly. Head round, its punctures fine and scattered, ocelli rather small, the front one distant from the others by about its length, hind ones closer to each other than to the eyes; mandibles toothed near the tip, the basal production large; clypeus broadly concave; antennæ pale fuscous apically, scape minutely punctured, sparsely short-hairy. Thorax elongate pyriform, slightly broader than head, distantly punctured, median grooves of mesonotum entire, lateral ones very shallow, abbreviated in front; scutellum rugoso-punctate; metathorax coarsely reticulate, basal area without median septum, extending two-thirds the length of the segment; mesopleuræ obsoletely punctured, mesosternum with a pair of strong beak-like projections in front. Abdomen petiolate, first segment small, longer than broad, nodose at tip, its punctures strong, confluent, ventral keel dentate anteriorly; second segment very sparsely and finely punctulate above and below, remaining segments impunctate, pygidium convex. Femora and tibiæ, except base, fuscous, remainder of legs testaceous. Wings hyaline, with faint yellow tinge, veins moderately strong, fuscous, stigma fuscous, third submarginal cell open apically. Vestiture sparse over all, pale yellowish white.

Length, 8.75 mm.

Fig. 53; mesosternum.

One male, collected by Mr. Samuel Henshaw at Pressy's Camp, Wenass Valley, Washington, July 7, 1882.

65. **Mutilla Pattersonæ** sp. nov.

Robust; testaceous, including antennæ and legs, process at base of mandibles strong, head with fine distant punctures, rounded behind, mesonotum closely punctate, the middle grooves distinct, mesosternum without armament, metathorax coarsely reticulate, the bisected areas small, abdomen petiolate, the first segment closely punctured subnodose, remaining segments impunctate; vestiture long, pale yellow, wings hyaline, veins and stigma testaceous, two submarginals.

Male. Robust, rufotestaceous, clothed with rather long and moderately dense whitish pile. Head round, finely punctured, ocelli large, the front one distant from the hind ones by less than its width, space between hind ones greater than between them and the eyes; clypeus uniformly concave, truncate in front; mandibles stout, basal process very large; antennæ wholly testaceous, scape minutely punctulate, its pubescence very short; under side of head polished, impunctate. Thorax elongate pyriform, broader than head, prothorax reticulate, mesonotum closely and finely punctured in front, a little more sparsely behind, the grooves distinct, middle ones entire, side ones abbreviated on the front third; metathorax rounded, coarsely reticulate on the disc, basal areas short and broad, in length less than three reticulations; mesosternum irregularly punctured, medially impressed, unarmed; mesopleuræ finely reticulate, the impressed smooth area

narrow. Abdomen robust, strongly petiolate, first segment one-third longer than broad at apex, closely punctured, sharply constricted from the second segment, but subnodose, ventral punctures coarser, keel also punctured; remainder of abdomen impunctate, except that ventrally the second segment bears fine distant punctures. Legs testaceous, tibial spurs somewhat darker. Wings subhyaline, veins testaceous, stigma fuscous, third submarginal wanting; in the middle of the hind margin is a suffused brownish cloud.

Length, 15 mm.

One male, Fort Washington, Cal., October 3, 1895, collected by Miss Rose Patterson, in whose honor the species is respectfully dedicated.

66. * **Mutilla albicincta** Fox (103).

Numerous specimens do not disagree with the description of this species except for individual differences, and may possibly be the same form, although they are from a different State, being taken at Arrogo, near Talarosa, New Mexico, August 13, at light (Townsend collector, Cockerell). Some of the specimens show a minute denticle on the mesosternum, which may be the beginning of a pronounced armature of future generations.

67. **Mutilla Westcottii** sp. nov.

Male. Elongate, rufo-testaceous. Head produced and rounded behind the eyes, hind portion truncate when viewed from above, sparsely clothed with long white hairs, which arise from the scattered minute punctures, no other punctures present; ocelli rather large, hind ones closer together than to the eyes; a deep, narrow line arises midway between the base of the antennæ and the anterior ocellus, in a large, deep puncture, and continues forward to the antennæ; clypeus broadly and shallowly concave, truncate apically; antennæ testaceous, reaching back to the middle coxæ, scape with short fine hairs and punctures above; mandibles blackened at the obliquely tridentate tips, white-bristly along their base. Thorax elongate pyriform, prothorax coarsely rugosely punctured, mesonotum with scattered deep punctures, shining, the grooves abbreviated in front, the middle ones fuscous, tegulæ testaceous, impunctate, scutellum coarsely rugosely punctate, metanotum coarsely reticulate, the basal areas about equalling two of the other meshes, its hairs very sparse and short, but becoming plumose, white and long laterally; mesopleuræ nearly impunctate in front, becoming deeply pitted on the bulbous hinder portion; mesosternum with two sharp, beak-like teeth. Abdomen very slender, petiole gradually broadening to the thorax, where it is two times as broad as at the base, over two times as long as apical width, nearly impunctate above, the sides with obscure punctation; remainder of the abdomen impunctate. Vestiture of the abdomen consists of scattered fine white hairs and an apical fringe of broad and strongly plumose white hairs, which give a banded appearance to the abdomen. The usual U-shaped speculum present on the third segment. Legs testaceous, becoming fuscous beyond the middle of the four posterior femora, front tarsi and all tibial spurs fuscous, hairs dusky

white. Wings cinereo-hyaline, veins fine narrow, fusco-testaceous, stigma fuscous, third submarginal completely wanting, nervure entering the second submarginal just before the middle of its angulate under side.

Length, 13 mm.

Fig. 57; hair from abdominal fringe.

One male, collected near Alberquerque, New Mexico, by Dr. O. S. Westcott.

68. **Mutilla melicausa** Blake (105).

A single male, Austin, Texas, October, 1900.

69. **Mutilla hebes** sp. nov.

Male. Reddish; head subquadrate with distinct punctures, hind ocelli further from each other than from the eyes, mesonotal punctures strong, basal areas of metanotum long, mesosternum with two broad, blunt, transverse teeth, petiole of abdomen nodose though not constricted on the sides, strongly punctured, abdominal punctures sparse, two submarginals, a dusky cloud in the hind margin of the wing, legs fuscous.

Testaceo-rufous; moderately slender; head subquadrate, produced and broadly rounded, punctures rather strong, separated so that a line from the eyes to a hind ocellus passes through five punctures. This line is slightly shorter than the distance between the hind ocelli, ocelli rather small. There is no depression or groove above the antennæ, but the space in front of the ocellus is impunctate. A short clypeal ridge runs upward toward the antennæ. Proclinate and erect hairs of the head very sparse. Antennæ rufo-testaceous, as long as head and thorax. Prothorax with a rather strong, irregular, subconfluent punctuation; mesonotum with strong, close, rounded punctures, the grooves much shortened; scutellum closely rugosely punctured; metanotal reticulum rather fine, the basal areas narrow, equalling four of the meshes in length; mesopleuræ confluently punctured in front, mesosternum coarsely punctured, with two very prominent sub-transverse teeth near the front portion, the teeth transversely grooved so as to be bicuspid; vestiture of thorax and petiole long, sparse, erect, whitish, in front with deflexed hairs also. Petiole of the abdomen one-third longer than broad at tip, its sides nearly straight, subnodose apically and constricted at the very tip, deeply and coarsely punctured, the anterior angles acute, venter coarsely rugose, medially crenulate; second segment sparsely and finely punctured except on the sides in front where the punctures become stronger and closely aggregated, its pubescence sparse, partly short and caudally deflected and partly long and erect, apically closely punctulate and with a short fringe of white subserrate hairs, third segment with a conspicuous speculum and a broad punctulate apical margin, its pubescence sparse, erect, the apical fringe sparse, the hairs not evidently serrate, remaining segments similar, pygidium finely margined and aciculate; venter similar, the punctures of the second segment stronger and closer than above, no apical fringes. Legs testaceous, the femora and tibiæ fusco-testaceous apically, the hairs and spurs whitish. Wings subhyaline, veins narrow, dark brown, stigma black, third submarginal cell wanting, first cubital vein blackened on its costal two-thirds, thence whitish, a suffused brownish spot in the middle of the hind margin.

Length, 7.5-9 mm.

Fig. 47; occiput: Fig. 52; mesosternum.

Described from two males taken at light at Arrogo, August 23d, and at Colorád, July 10th, New Mexico. Contributed by Professor Cockerell. Type in collection of the National Museum.

This species apparently comes near *orestes* and *melicausa*, but differs in the darkened legs, maculate wings and structure of the mesosternal teeth.

70. **Mutilla territa** Cockerell (106).

Three specimens, one of which is castaneous, from Colorado and Las Cruces, New Mexico. July and September. At light.

71. **Mutilla Erebus** sp. nov.

Rufotestaceous; head rounded, sparsely punctulate, prothorax confluently punctured, mesonotal punctures coarse, slightly separated, reticulum of metathorax large, mesosternum with two sharp teeth, petiole of abdomen deeply punctured, nodose apically and strongly constricted from the sparsely punctulate second segment, abdominal segments with a narrow fringe of plumose hairs, legs testaceous, wings hyaline, veins testaceous, third submarginal wanting.

Male. Rufotestaceous. Head but little produced behind the eyes, occipital angles not broadly rounded; sparsely and finely punctate; ocelli large, the hind ones one-third further from each other than their distance to the eye, no groove between the antennæ, but at the very base of the shallow clypeus is a short, sharp, truncate, transverse projection continued laterally and posteriorly as a fine carina, clypeus sparsely punctulate; mandibles strongly rounded, tip blackened, basal tooth moderate, their hairs short; antennæ concolorous with the body, scape testaceous, subconfluently punctured; the hairs of the head are sparse and white, consisting partly of long, serrate, erect ones and partly of short proclinate ones. Prothorax confluently punctured, mesonotal punctures stronger and deeper but separated, parapsidal grooves abbreviated on the front third, scutellum rugosely punctured, metanotum very coarsely reticulated, the basal areas small, equalling three normal spaces, mesopleuræ punctured, the punctures becoming areolated towards the coxæ; mesosternum armed with two strong, acute, downward-projecting teeth near their anterior portion. Petiole of abdomen one and two-thirds times as long as broad, the apical margin twice as broad as the basal, subcampanulate in outline but not suddenly narrowed in front, quite strongly nodose, the hind margin constricted, punctuation dense and deep along the sides but becoming more or less sparse on the dorsum; second segment sparsely punctulate above and below, remaining segments minutely punctulate, last dorsal finely aciculate, but not margined. Coxæ and legs testaceous over all, the spurs and spines concolorous, but the hairs whitish yellow. Wings hyaline, veins testaceous, stigma fusco-testaceous, second discoidal and third submarginal completely wanting, marginal, first submarginal and first discoidal cells slender, first submarginal receiving the recurrent vein just before the middle of the cell. Vestiture of thorax and abdomen sparse whitish, partly erect and partly delivous, the hairs presenting a serrate appearance, becoming plumose about the base of the wing, the metanotum and the abdominal incisures, so as to give a fasciate appearance to the abdomen.

Length, 11 mm.

Fig. 48; occiput: fig. 50; mesosternum.

One male, collected by T. D. A. Cockerell at Mesilla Park, New Mexico. Type in National Museum.

This species, according to Mr. Fox's tabulation, is related to *helicaon*, but is apparently distinct in the fine punctures of the head, the banded abdomen and the neuration of the wings.

72. * **Mutilla nokomis** Blake (108).

The collection of the Museum of Comparative Zoology contains this species from Texas.

73. **Mutilla Birkmani** sp. nov.

Female. Wholly dark ferruginous. Head punctured; eyes rounded but distinctly facetted, very convex; mandibles subacute, with a slight inner notch; thorax rugose, pleuræ moderately punctured; petiole of abdomen small, nodose; second segment with coarse, elongate punctures throughout; pygidium prominent, deeply striate longitudinally. Pubescence pale, moderately dense but not concealing the sculpture except on the metathorax; second segment of abdomen apically with a patch of black hairs.

Entirely dark ferruginous. Head subquadrate, straight behind, subequal to the thorax in breadth, closely finely punctured, more or less densely clothed with pale yellow, appressed, irregular pubescence above and with longer erect hairs on the vertex and base of the mandibles; eyes hemispherical, facetted; anterior edge of the clypeus convex, sinuous; scape curved at the middle, clothed above with short, coarse, glittering hairs, subequal in length to one-half the width of the front, pedicel oblong, first flagellar joint one-fourth longer than the second; mandibles stout, bent, bluntly attenuate on the straight outer three-fourths, tipped with black, palpi piceous. Thorax longer than wide, ovate, regularly narrowed behind, not constricted, the sides convex, rugoso-punctate, coarser behind, the disc with appressed black pubescence, elsewhere with appressed and erect whitish hairs, disc of metathorax with a dense patch of converging appressed pubescence, which is margined by erect hairs; pleuræ densely and comparatively coarsely punctured. Petiole of abdomen when viewed from above nearly square, its anterior angles dentiform, rugosely punctured, the ventral keel emarginate before the middle; second segment densely and uniformly provided with elongate punctures, from which arise the yellowish appressed pubescence, its anterior and posterior margins provided with a median patch of black pubescence, that of the hind margin the denser, laterally and on the venter and the remaining segments the hairs become longer, whitish; apical segments with finer punctures; second ventral with coarse but distant punctures; pygidium margined and sulcate with close longitudinal striæ. Legs fairly stout, clothed with long white hairs, the four posterior tibiæ spinose.

Length, 4.5 mm.

Fig. 34; petiole.

Described from five specimens collected by the Rev. G. Birkman at Fedor, Lee County, Texas.

It is with pleasure that I am able to dedicate this insect to one

formly fuliginous except that the second submarginal ends in a subhyaline spot. This continues basally just within the second submarginal as a subhyaline streak, crossing the center of the first submarginal and ending at the base of the stigma. Veins and stigma black, marginal cell longer than the first submarginal, bluntly acuminate, second submarginal shorter than the first, strongly narrowed toward the marginal, receiving the recurrent nervure at the middle. In one specimen the pentagonal third submarginal and the third discoidal are vaguely defined, in the other wholly wanting.

Length, 7.25–10.5 mm.

Two males. Forest Hill, Mass., August 31, 1898 (Samuel Henshaw), and Woods Hole, Mass., August, 1900.

Henshawi is placed with the species of the group *pennsylvanica* because of its rudimental eyes and the neuration of the wing. It is quite different, however, from the other males of the division in the form of the first abdominal segment, which is quite sessile with the second, as in the females. If this character be considered of more importance than the other, the species would be placed in the Western group *anthophoræ* with the species *adonis* Fox, or *thamyras* Fox. From these slender species the new form is obviously far removed.

54. **Mutilla pennsylvanica** Lepeletier (91).

Four specimens from Fedor, Texas (Birkman). May–October.

55. **Mutilla auripilis** Blake (92).

Not rare in Central Texas, occurring at Fedor and Austin.

56. **Mutilla jason** Fox (93).

One specimen taken by the writer at Austin, Texas.

57. **Mutilla balteola** Blake (94).

Plate IV, fig. 32; petiole.

Not rare at Fedor and Austin, Texas. One specimen differs in the reduced white fasciæ of the abdomen; that of the second segment bears no median projection anteriorly.

Group *imperialis*.

The species of this group and of the next are closely related, forming the old genus *Photopsis* of Blake as far as the males are concerned. Were it not for the numerous species here included, it would be well not to attempt to subdivide this group, at least not on the grounds taken. The division into genera, such as *Odontophotopsis*, is equally untenable, as the sexual character chosen from one sex is subject to great variation. For this reason the species

we have seen are grouped together, but some relationship at least is expressed in the following key for the separation of the males. The descriptions of the new species have been interpolated as near to their relatives as is practicable. The number of undescribed forms occurring in the Southwestern States is remarkable. The males are caught mostly at lights which they seek in their nocturnal flights. The females, however, are much more seclusive, and have to be sought for on the hot, arid sand during the day-time.

Mesosternum with a pair of strong projections near its anterior border. (Subgen. **Odontophotopsis** Viereck) 2.

Mesosternum with a pair of crenulate longitudinal ridges, but with no strong tooth anteriorly.....11.

Mesosternum completely unarmed.....(**Photopsis** Blake) 14.

2. The projection of the mesosternum acutely pointed, more or less beak-like and longitudinally placed, though sometimes small; wings hyaline..3.

The projections at most truncate pyramidal, but not pointed, rather transverse; wings with brown clouds.....10.

3. Petiole of abdomen rather nodose, constricted apically, and with stronger punctures than those of the second segment.....4.

Petiole nearly sessile with the second segment, not nodose and nearly impunctate; abdominal segments fringed with plumose hairs.....8.

4. Petiole twice as long as broad, with fine punctures on the disc; all the abdominal segments fringed with strongly plumose white hairs. **Westcottii** sp n.

Petiole shorter and with coarser punctures.....5.

5. Mesonotum with fine scattered punctures .....6.

Mesonotum with close deep punctures, the grooves abbreviated on the anterior half; veins thin, testaceous, wings hyaline.....7.

6. Parapsidal grooves extending nearly the whole length of the notum; veins strong brown, wings tinged with brown .....**pudica** sp. n.

Grooves wanting; wings hyaline, veins testaceous.....**grata** sp. n.

7. All the abdominal segments fringed with plumose hairs; legs and antennæ testaceous; hind ocelli nearer the eyes than each other. **Erebus** sp. n.

Only the second abdominal segment with a fringe of plumose hairs, the remaining vestiture dense and long, however; ocelli nearer each other than the eyes; antennæ and part of femora fuscous. **melicausa** Blake.

8. Abdomen with setigerous punctures, fuscous apically; femora blackened at tip.....**concolor** Cress.

Hairs of abdomen not arising from punctures; smaller species with pale legs.....9.

9. Mesothorax with strong punctures and complete grooves; metathorax reticulated over all above .....**hamata** sp. n.

Mesothorax with shallow punctures and abbreviated grooves; metathorax with elongate basal areas.....**trita** sp. n.

10. Head with weak punctures, petiole of abdomen with strong punctures. **hebes** sp. n.
Head with strong punctures, petiole with weak ones.....**danaus** Blake.
11. Petiole of abdomen nodose, abdomen, legs and antennæ black or blackened.12.
Petiole broader, subsessile; insect rufo-testaceous.....13.
12. Large; wings infumated; second segment of abdomen with deep punctures; hind ocelli nearer the eyes than each other.....**Cockerelli** sp. n.
Small; wings hyaline; second segment nearly impunctate; hind ocelli not nearer the eyes than each other.....**bellerophon** Fox.
13. Punctures of head sparse and deep; abdomen rufo-testaceous, covered with erect pubescence.....**simplicieventris** sp. n.
Punctures of head irregular, becoming confluent between ocelli; second segment of abdomen with a brown pattern, and with decumbent pubescence.....**Wheeleri** sp. n.
14. Petiole of abdomen nodose, sharply constricted at the second segment and strongly punctured.....15.
Petiole sessile or subsessile with the second segment, at most punctulate..20.
15. Reticulum of metathorax comparatively fine.....16.
Reticulum of metathorax coarse.....17.
16. Head, thorax and legs dark, pubescence yellow.....**imperialis** Bl.
Insect and appendages pale, with long white hairs.....**territa** Ckll.
17. Petiole of abdomen slender and nearly impunctate; abdomen dark. **mesillensis** Ckll.
Petiole of abdomen coarsely sculptured; abdomen largely reddish.....18.
18. Mesonotum with shallow punctures and dense hairs; hind ocelli but little further from each other than from the eyes....**Pattersonæ** sp. n.
Mesonotum with deeper punctures and sparse hair.....19.
19. Hind ocelli as far from each other as from the eyes; wings crossed by a fuscous cloud from the stigma.....**danaus** Bl., *var.*
Hind ocelli large, considerably more distant from each other than from the eye; wings not clouded.....**albicincta** Fox.
20. Petiole of abdomen broadly sessile with the following segment; metathorax reticulate over all.....**noctivaga** sp. n.
Petiole subsessile; metathorax with an elongated, smooth basal area.....21.
21. Basal areas of metathorax very large, occupying nearly the whole segment; insect pale yellow and small.....**acontius** Fox.
Basal smooth areas of normal extent; larger reddish species.....22.
22. Hind ocelli nearer the eyes than to each other; parapsidal grooves impressed; pubescence coarse, yellow.....**unicolor** Cress.
Hind ocelli not nearer the eyes than to each other; grooves indistinct; pubescence sparse whitish.....**alemon** Fox.

58. **Mutilla imperialis** Blake (96).

Several specimens indefinitely labelled Texas examined (M. C. Z.).

59. **Mutilla danaus** Blake (99).

Fig. 54; mesosternum.

Austin, Texas (May 5, 1900); Mesilla (at light, August 28th),

Las Cruces (September 6th), La Cueva, Organ Mountains (Altitude 5300 ft., at light, September 4th), New Mexico (Cockerell). Another specimen from the Chicago Academy of Science labelled Texas.

60. * **Mutilla bellerophon** Fox (100).

Fig. 59; wing.

Numerous specimens, Austin and Fedor, Texas. The punctuation of the head and abdomen is variable but correlated,—the head punctures are rather fine in some specimens and close in others. When the head is finely punctured the second abdominal segment is smooth, otherwise it is punctulate with scattered punctures. Some specimens have the abdomen rufous. Several distinctive characters of the Texas specimens are obvious and may be noticed: the bi sected area of the metathorax is as long as three areoles; the outer cubital vein is attenuated before and behind, while the inner cubital is evanescent posteriorly; the marginal cell is clouded toward the stigma; and the mesosternum has two crenulate ridges.

61. **Mutilla Cockerelli** sp. nov.

Head, thorax and petiole of abdomen reddish, remainder of abdomen, legs and antennæ black, wings infumated, veins black, coarsely punctured species; mesosternum with small teeth.

Male. Head rounded, broadly so behind the eyes, moderately punctured, clothed with erect, whitish, scattered hairs; ocelli relatively small, the distance between the hind ones three times the diameter of an ocellus and greater than the distance to the eyes; the shallow space in front of the anterior ocellus connected with the posterior edge of the clypeus by a narrow impressed line arising in a deep puncture in front of the ocellus; antennæ wholly black, shorter than the head and thorax, the scape densely punctured and with short, very sparse pubescence. Thorax shining, prothorax confluently punctured, mesothoracic punctures separated, deep, the grooves linear and black, middle ones complete; scutellum rugosely punctured; metanotum reticulate, but not coarsely, basal areas confusedly crenulate transversely, mesopleural punctures strong only in the centre of the bulbous portion; mesosternum with two arcuate and obliquely diverging lines of transverse denticles. Petiole of abdomen nodose, constricted behind, the front angles sharp, strongly and confluently rugoso-punctate, its black hind margin with a scattered white fringe; second abdominal segment strongly punctured, more closely so in front and laterally, its hind margin with a conspicuous white fringe of simple and plumose hairs; remainder of abdomen punctulate, and with a similar white fringe; venter punctured and fringed like the dorsum. Coxæ piceous, legs black, tibial spurs fuscous, hairs silvery white. Wings lightly infumated, stigma black, veins blackish, pubescence black, third submarginal obscure.

Length 10.5 mm.

Fig. 55; mesosternum.

narrow. Abdomen robust, strongly petiolate, first segment one-third longer than broad at apex, closely punctured, sharply constricted from the second segment, but subnodose, ventral punctures coarser, keel also punctured; remainder of abdomen impunctate, except that ventrally the second segment bears fine distant punctures. Legs testaceous, tibial spurs somewhat darker. Wings subhyaline, veins testaceous, stigma fuscous, third submarginal wanting; in the middle of the hind margin is a suffused brownish cloud.

Length, 15 mm.

One male, Fort Washington, Cal., October 3, 1895, collected by Miss Rose Patterson, in whose honor the species is respectfully dedicated.

66. * **Mutilla albicincta** Fox (103).

Numerous specimens do not disagree with the description of this species except for individual differences, and may possibly be the same form, although they are from a different State, being taken at Arrogo, near Talarosa, New Mexico, August 13, at light (Townsend collector, Cockerell). Some of the specimens show a minute denticle on the mesosternum, which may be the beginning of a pronounced armature of future generations.

67. **Mutilla Westcottii** sp. nov.

Male. Elongate, rufo-testaceous. Head produced and rounded behind the eyes, hind portion truncate when viewed from above, sparsely clothed with long white hairs, which arise from the scattered minute punctures, no other punctures present; ocelli rather large, hind ones closer together than to the eyes; a deep, narrow line arises midway between the base of the antennæ and the anterior ocellus, in a large, deep puncture, and continues forward to the antennæ; clypeus broadly and shallowly concave, truncate apically; antennæ testaceous, reaching back to the middle coxæ, scape with short fine hairs and punctures above; mandibles blackened at the obliquely tridentate tips, white-bristly along their base. Thorax elongate pyriform, prothorax coarsely rugosely punctured, mesonotum with scattered deep punctures, shining, the grooves abbreviated in front, the middle ones fuscous, tegulæ testaceous, impunctate, scutellum coarsely rugosely punctate, metanotum coarsely reticulate, the basal areas about equalling two of the other meshes, its hairs very sparse and short, but becoming plumose, white and long laterally; mesopleuræ nearly impunctate in front, becoming deeply pitted on the bulbous hinder portion; mesosternum with two sharp, beak-like teeth. Abdomen very slender, petiole gradually broadening to the thorax, where it is two times as broad as at the base, over two times as long as apical width, nearly impunctate above, the sides with obscure punctation; remainder of the abdomen impunctate. Vestiture of the abdomen consists of scattered fine white hairs and an apical fringe of broad and strongly plumose white hairs, which give a banded appearance to the abdomen. The usual U-shaped speculum present on the third segment. Legs testaceous, becoming fuscous beyond the middle of the four posterior femora, front tarsi and all tibial spurs fuscous, hairs dusky

white. Wings cinereo-hyaline, veins fine narrow, fusco-testaceous, stigma fuscous, third submarginal completely wanting, nervure entering the second submarginal just before the middle of its angulate under side.

Length, 13 mm.

Fig. 57; hair from abdominal fringe.

One male, collected near Alberquerque, New Mexico, by Dr. O. S. Westcott.

68. **Mutilla melicausa** Blake (105).

A single male, Austin, Texas, October, 1900.

69. **Mutilla hebes** sp. nov.

Male. Reddish; head subquadrate with distinct punctures, hind ocelli further from each other than from the eyes, mesonotal punctures strong, basal areas of metanotum long, mesosternum with two broad, blunt, transverse teeth, petiole of abdomen nodose though not constricted on the sides, strongly punctured, abdominal punctures sparse, two submarginals, a dusky cloud in the hind margin of the wing, legs fuscous.

Testaceo-rufous; moderately slender; head subquadrate, produced and broadly rounded, punctures rather strong, separated so that a line from the eyes to a hind ocellus passes through five punctures. This line is slightly shorter than the distance between the hind ocelli, ocelli rather small. There is no depression or groove above the antennæ, but the space in front of the ocellus is impunctate. A short clypeal ridge runs upward toward the antennæ. Proclinate and erect hairs of the head very sparse. Antennæ rufo-testaceous, as long as head and thorax. Prothorax with a rather strong, irregular, subconfluent punctuation; mesonotum with strong, close, rounded punctures, the grooves much shortened; scutellum closely rugosely punctured; metanotal reticulum rather fine, the basal areas narrow, equalling four of the meshes in length; mesopleuræ confluently punctured in front, mesosternum coarsely punctured, with two very prominent sub-transverse teeth near the front portion, the teeth transversely grooved so as to be bicuspid; vestiture of thorax and petiole long, sparse, erect, whitish, in front with deflexed hairs also. Petiole of the abdomen one-third longer than broad at tip, its sides nearly straight, subnodose apically and constricted at the very tip, deeply and coarsely punctured, the anterior angles acute, venter coarsely rugose, medially crenulate; second segment sparsely and finely punctured except on the sides in front where the punctures become stronger and closely aggregated, its pubescence sparse, partly short and caudally deflected and partly long and erect, apically closely punctulate and with a short fringe of white subserrate hairs, third segment with a conspicuous speculum and a broad punctulate apical margin, its pubescence sparse, erect, the apical fringe sparse, the hairs not evidently serrate, remaining segments similar, pygidium finely margined and aciculate; venter similar, the punctures of the second segment stronger and closer than above, no apical fringes. Legs testaceous, the femora and tibiæ fusco-testaceous apically, the hairs and spurs whitish. Wings subhyaline, veins narrow, dark brown, stigma black, third submarginal cell wanting, first cubital vein blackened on its costal two-thirds, thence whitish, a suffused brownish spot in the middle of the hind margin.

Length, 7.5–9 mm.

Fig. 47; occiput: Fig. 52; mesosternum.

Described from two males taken at light at Arrogo, August 23d, and at Colorád, July 10th, New Mexico. Contributed by Professor Cockerell. Type in collection of the National Museum.

This species apparently comes near *orestes* and *melicausa*, but differs in the darkened legs, maculate wings and structure of the mesosternal teeth.

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Three specimens, one of which is castaneous, from Colorado and Las Cruces, New Mexico. July and September. At light.

71. **Mutilla Erebus** sp. nov.

Rufotestaceous; head rounded, sparsely punctulate, prothorax confluently punctured, mesonotal punctures coarse, slightly separated, reticulum of metathorax large, mesosternum with two sharp teeth, petiole of abdomen deeply punctured, nodose apically and strongly constricted from the sparsely punctulate second segment, abdominal segments with a narrow fringe of plumose hairs, legs testaceous, wings hyaline, veins testaceous, third submarginal wanting.

Male. Rufotestaceous. Head but little produced behind the eyes, occipital angles not broadly rounded; sparsely and finely punctate; ocelli large, the hind ones one-third further from each other than their distance to the eye, no groove between the antennæ, but at the very base of the shallow clypeus is a short, sharp, truncate, transverse projection continued laterally and posteriorly as a fine carina, clypeus sparsely punctulate; mandibles strongly rounded, tip blackened, basal tooth moderate, their hairs short; antennæ concolorous with the body, scape testaceous, subconfluently punctured; the hairs of the head are sparse and white, consisting partly of long, serrate, erect ones and partly of short proclinate ones. Prothorax confluently punctured, mesonotal punctures stronger and deeper but separated, parapsidal grooves abbreviated on the front third, scutellum rugosely punctured, metanotum very coarsely reticulated, the basal areas small, equalling three normal spaces, mesopleuræ punctured, the punctures becoming areolated towards the coxæ; mesosternum armed with two strong, acute, downward-projecting teeth near their anterior portion. Petiole of abdomen one and two-thirds times as long as broad, the apical margin twice as broad as the basal, subcampanulate in outline but not suddenly narrowed in front, quite strongly nodose, the hind margin constricted, punctuation dense and deep along the sides but becoming more or less sparse on the dorsum; second segment sparsely punctulate above and below, remaining segments minutely punctulate, last dorsal finely aciculate, but not margined. Coxæ and legs testaceous over all, the spurs and spines concolorous, but the hairs whitish yellow. Wings hyaline, veins testaceous, stigma fusco-testaceous, second discoidal and third submarginal completely wanting, marginal, first submarginal and first discoidal cells slender, first submarginal receiving the recurrent vein just before the middle of the cell. Vestiture of thorax and abdomen sparse whitish, partly erect and partly delivous, the hairs presenting a serrate appearance, becoming plumose about the base of the wing, the metanotum and the abdominal incisures, so as to give a fasciate appearance to the abdomen.

Length, 11 mm.

Fig. 48; occiput: fig. 50; mesosternum.

One male, collected by T. D. A. Cockerell at Mesilla Park, New Mexico. Type in National Museum.

This species, according to Mr. Fox's tabulation, is related to *helicaon*, but is apparently distinct in the fine punctures of the head, the banded abdomen and the neuration of the wings.

72. * **Mutilla nokomis** Blake (108).

The collection of the Museum of Comparative Zoology contains this species from Texas.

73. **Mutilla Birkmani** sp. nov.

Female. Wholly dark ferruginous. Head punctured; eyes rounded but distinctly facetted, very convex; mandibles subacute, with a slight inner notch; thorax rugose, pleuræ moderately punctured; petiole of abdomen small, nodose; second segment with coarse, elongate punctures throughout; pygidium prominent, deeply striate longitudinally. Pubescence pale, moderately dense but not concealing the sculpture except on the metathorax; second segment of abdomen apically with a patch of black hairs.

Entirely dark ferruginous. Head subquadrate, straight behind, subequal to the thorax in breadth, closely finely punctured, more or less densely clothed with pale yellow, appressed, irregular pubescence above and with longer erect hairs on the vertex and base of the mandibles; eyes hemispherical, facetted; anterior edge of the clypeus convex, sinuous; scape curved at the middle, clothed above with short, coarse, glittering hairs, subequal in length to one-half the width of the front, pedicel oblong, first flagellar joint one-fourth longer than the second; mandibles stout, bent, bluntly attenuate on the straight outer three-fourths, tipped with black, palpi piceous. Thorax longer than wide, ovate, regularly narrowed behind, not constricted, the sides convex, rugoso-punctate, coarser behind, the disc with appressed black pubescence, elsewhere with appressed and erect whitish hairs, disc of metathorax with a dense patch of converging appressed pubescence, which is margined by erect hairs; pleuræ densely and comparatively coarsely punctured. Petiole of abdomen when viewed from above nearly square, its anterior angles dentiform, rugosely punctured, the ventral keel emarginate before the middle; second segment densely and uniformly provided with elongate punctures, from which arise the yellowish appressed pubescence, its anterior and posterior margins provided with a median patch of black pubescence, that of the hind margin the denser, laterally and on the venter and the remaining segments the hairs become longer, whitish; apical segments with finer punctures; second ventral with coarse but distant punctures; pygidium margined and sulcate with close longitudinal striæ. Legs fairly stout, clothed with long white hairs, the four posterior tibiæ spinose.

Length, 4.5 mm.

Fig. 34; petiole.

Described from five specimens collected by the Rev. G. Birkman at Fedor, Lee County, Texas.

It is with pleasure that I am able to dedicate this insect to one

who has been an enthusiastic observer of the local fauna of Central Texas for many years.

The introductory characters in combination tersely indicate the systematic position of this species, which seems to lie between *halcyone* Fox and *myrrha* Fox, combining the characteristics of the two species.

Types in the collections of Mr. Birkman and of the writer.

74. **Mutilla nanula** Dalla Torre (124).

Occurs rarely at Austin, Texas.

Group *anthophoræ*.

75. * **Mutilla concolor** Cresson (127).

California (M. C. Z.), Texas (Chicago Acad. Sci.).

Mr. Cockerell has sent a large series of what is apparently this species, collected at La Cueva, Organ Mountains (altitude 5500 ft.), September 4th; at Mesilla Park, June 8th; and at Arrogo, near La Luz, August 23d, New Mexico. All the specimens were taken at light.

The shape of the petiole of the abdomen is subject to variation, but as the forms otherwise grade into each other, we can be certain that all belong to a single species. Some specimens have the petiole subnodose and punctate, as in the *imperialis* group, while others have the first and second segments of the abdomen nearly sessile, the first being almost impunctate.

76. **Mutilla hamata** sp. nov.

Male. Rufotestaceous. Head rounded behind, sparsely punctulate, mesonotum deeply and closely punctured, metanotum reticulate over all, mesosternum with two transverse obliquely pointed teeth, petiole impunctate, sessile with the impunctate second segment, two submarginals

Rufotestaceous; rather slender. Head broadly rounded and produced behind the eyes, nearly impunctate and very sparsely hairy; ocelli moderately large, the hind ones a little further from each other than from the eyes. Midway between the front ocellus and the base of the antennæ is a punctiform depression which extends forward to the base of the clypeus as a narrow groove ending in the transverse basal ridges of the clypeus; mandibles stout, blackened at the tips; antennæ concolorous with the body, short, the scape not paler, short and stout, punctured and provided with very short and sparse bristle-like hairs. Prothorax confluently rugosely punctate; mesonotum with close deep punctures, the grooves but slightly abbreviated in front; scutellum contiguously and deeply punctured; metathorax moderately reticulated over all; punctures of mesopleuræ becoming broader towards the coxæ; mesosternum with two strong

transverse triangular projections, the space between these and the middle coxæ roughened by small transverse ridges. Petiole of abdomen very finely and sparsely punctulate, broadly sessile with the second segment, its length about equalling its breadth, the front angles bluntly dentiform, the ventral surface provided with a A-shaped carina, which is emarginate before its anterior termination; remainder of abdomen impunctate; pygidium broad and rather blunt, very finely aciculate. Hairs of thorax and abdomen sparse, dusky; abdominal segments except the first provided with a thin fringe of white plumose hairs. Legs testaceous; hind femora, tarsi, and tibial spurs lightly infuscated. Wings hyaline, veins testaceous, stigma testaceous but a little darker than the veins, second submarginal cell receiving its recurrent vein before the middle, third submarginal wanting.

Length, 8 mm.

Fig. 60; front wing.

One male collected by Mr. C. H. T. Townsend at La Cueva, Organ Mountains, New Mexico. Altitude about 5300 feet. The insect was taken at light on the 9th of September. The species seems to come near *juxta* Blake.

Type in collection of the National Museum, Washington, D. C.

77. **Mutilla unicolor** Cresson (137).

A single specimen examined from the collection of the Museum of Comparative Zoology, collected in California, in August.

78. **Mutilla anthophorse** Ashmead (138).

A female specimen of what seems to belong to this species was collected at Yuma, Arizona.

As Mr. Ashmead's description of this Californian species is not accessible in this city, the determination rests on Mr. Fox's analytical key.

79. **Mutilla tapajos** Blake (143).

Texas (M. C. Z.).

80. **Mutilla simpliciventris** sp. nov.

Male. Moderately robust, rufotestaceous; head broadly rounded, moderately punctured, hind ocelli spaced apart as far as they are from the eyes; prothorax and mesothorax coarsely punctured, the grooves abbreviated anteriorly, mesosternum with two crenulate ridges, metathorax strongly reticulate, the bisected anterior area as long as five of the meshes; petiole of abdomen triangular sessile, the punctures of the first and second segments strong, pygidium finely margined, last ventral with deep punctures; vestiture simple; wings subhyaline, veins and stigma testaceous, third submarginal nearly obliterated, second submarginal large.

Rufotestaceous, rather robust; head slightly produced behind the eyes, hind angles broad, hind margin truncate, punctures rather deep and close between the

eyes, becoming somewhat sparser on the occiput, hind ocelli but slightly further apart than their distance to the eyes, ocellar triangle blackish; clypeus with a pyramidal elevation on its posterior edge; mandibles very robust; antennæ as long as head and thorax, scape concolorous with the head, flagellum fuscous. Prothorax deeply and contiguously punctured, mesonotum subconfluently punctured, the punctures coarse and deep, shining, with four deep polished grooves abbreviated in front; metathorax strongly reticulate, the basal areas well bounded, elongate; pleuræ with finer punctures, the constrictions polished; mesosternum with small, close punctures, deeply impressed medially and on each side of this depression with a longitudinal row of seven denticles; vestiture of thorax very sparse. Petiole of abdomen but little longer than broad at tip and nearly sessile with the second segment, strongly convex, sparsely and rather strongly punctured, the punctures elongate anteriorly, ventrally with elongate pits, the low median carina only slightly crenulate; second segment as strongly punctured as the first, the punctures rather elongate; remaining segments minutely but not confluently punctulate on outer half; pygidium sharply margined; second segment of venter with stronger and closer punctures than the second dorsal, last ventral segment deeply and irregularly punctured; vestiture sparse, white, mostly erect, no apical fringes, hairs of last two segments yellow. Legs normal, slightly paler than the body, tibial spurs testaceous, hind ones one-half the length of the metatarsus, the sparse hairs white. Wings subhyaline, with a yellowish tinge, veins testaceous, stigma fusco-testaceous, second submarginal cell large, its outer border equal to its hind border, third submarginal nearly obsolete.

Length, 10 mm.

Fig. 56; mesosternum.

One male from the Peabody Collection of the Museum of Comparative Zoology, Cambridge, Mass. Captured in Texas, no definite locality given.

This species differs from *M. Wheeleri*, its nearest relative, by the square shape of the head, sparser and deeper punctures of the head, the unicolorous and more slender abdomen, which is covered with erect white vestiture, by the paler wings and deeper second submarginal cell.

81. **Mutilla Wheeleri** sp. nov.

Male. Rufotestaceous; head rounded, irregularly punctured, the vertex confluently, hind ocelli nearer the eyes than each other; pro- and mesothorax deeply punctured, the grooves abbreviated anteriorly; metathorax moderately reticulate, the area as long as four areoles; mesosternum with a transversely rugose ridge on each side of the median line; petiole subsessile, the punctures coarse in front, posteriorly like those of the second segment, moderate; vestiture simple, abdomen castaneous apically; wings cinerascent, third submarginal weak, veins blackish, second submarginal elongate.

Rufotestaceous; the ocellar triangle and the tips of the mandibles black; a transverse, medially emarginate, subapical, suffused fascia of the second abdominal segment castaneous. Head rounded, moderately produced behind the eyes, not

truncate posteriorly, equalling in width the thorax, the vertex and front closely, the occiput sparsely, finely punctured, the punctures of the ocellar triangle transversely confluent; ocelli comparatively small, the front one flattened, distant its own width from the posterior ones which are separated slightly more than their distance from the eyes; clypeus raised at the middle of the base; mandibles pointed, densely pubescent, the basal production strong; antennæ defective. Pro- and mesothorax deeply punctured, the punctures subconfluent, especially on the dorsum where they become transversely so, mesonotum with four deeply impressed grooves abbreviated on their anterior third; scutellum rugoso-punctate, metathorax moderately reticulate, the basal areas long; the constrictions of the pleuræ slight, polished, remainder closely punctate; thorax elongate ovate, but little narrowed behind, prothorax with long, erect, whitish hairs, remaining hairs shorter and sparse; mesosternum nearly bare, closely punctured, deeply impressed medially, the impressiom bounded by a ( )-shaped ridge consisting of seven transverse teeth, the front one black and strongest. Petiole of abdomen somewhat longer than broad at tip, nearly sessile with the second segment, finely and sparsely punctured, the punctures elongate and coarser in front; second segment more densely punctured along the sides, sparsely and irregularly on the disc; the apical margin of the remaining segments fringed with whitish-hairs; no erect hairs except on petiole; first ventral segment sharply carinate in front, second segment subconfluently punctured in front. Legs normal, without bristles, tibial spurs long, testaceous, the hind ones two-thirds the length of the metatarsi. Wings subhyaline, cinerascent apically, veins and stigma fuscous, second submarginal conspicuously longer than broad, its hind border longer than the second transverse cubital vein; third submarginal cell weak.

Length, 8 mm.

Described from one male, collected by the writer at Austin, Texas, May, 1901, and named in honor of William Morton Wheeler, my talented instructor, in memory of the many pleasant hours spent with him in the Texas-country. It differs from *hyalina* Blake by the coarser punctuation and different venation.

82. **Mutilla trita** sp. nov.

Small, pale, testaceous, thorax sparsely punctured, basal areas of metathorax moderate, mesosternum with two short teeth, petiole smooth, nearly sessile with the smooth second segment, hairs of body sparse, the abdominal fringes finely plumose, wings hyaline, veins pale yellow, third submarginal wanting.

Male. Small, rather slender, pale testaceous species. Head rounded, occipital angles not broad, little produced behind the eyes, ocellar triangle infuscated, the dark color diffused over the front; head very sparsely punctured; ocelli moderate, the hind ones slightly further from each other than from the eyes; the punctures of the front become deeper toward the antennæ, replacing the median groove; clypeus simple; tips of mandibles blackened, the basal tooth weak, obtuse; antennæ short, testaceous, scape paler, almost glabrous. Prothorax roughened but not punctured; mesonotum with moderate separated punctures and strongly abbreviated grooves; scutellum finely rugose; metanotum with coarse but shallow reticulation, the basal areas equalling three areoles; meso-

sternum roughened except medially and with two sharp but small dentiform projections rather near the hind portion. Petiole of abdomen as wide as long and twice as wide at tip as at base, its sides nearly straight, basal angles dentiform, above lightly convex, impunctate, not constricted behind, but nearly sessile with the impunctate second segment; remainder of abdomen impunctate but less shining; pygidium narrow, very finely aciculate. Legs short, slender, pale yellow, the joints and the tibial spurs testaceous. Wings hyaline, veins pale yellow, stigma brownish, third submarginal wanting, second receiving the recurrent nervure at its basal third.

Length, 6.25 mm.

Fig. 51; mesosternum.

One male. Las Cruces, New Mexico, Cockerell, No. 2335. Collected by Prof. E. O. Wooten. Type in National Museum.

83. **Mutilla pallida** Blake (145).

The indefinite locality Texas given at Cambridge.

84. * **Mutilla alemon** Fox (147).

Three specimens from Texas, one from Austin, the others without definite locality label (M. C. Z.); and three from New Mexico (Saint Augustine, Las Cruces and Arrogo; Cockerell), appear to belong to this species. The differences are of minor importance, but may be noted: legs sometimes false fuscous, the femora and tibiæ and the antennæ darker fuscous. The basal area of the metathorax is much shortened; the apical margins of the abdominal segments not distinctly fringed, the hair somewhat soiled.

85. **Mutilla acontius** Fox (148).

Four specimens, collected by Mr. Townsend, at light, in the Organ Mountains, New Mexico, about 5300 feet altitude, September 4th. These have comparatively long pubescence, and the reticulum of the metathorax is of large though shallow mesh. But two submarginal cells are present.

86. **Mutilla noctivaga** sp. nov.

Male. Robust, testaceo-rufous, completely clothed with fine, short, sparse, whitish hairs; head broad, sparsely punctured, humeri prominent, mesonotum closely and deeply punctured, mesosternum unarmed, metathorax reticulate, devoid of the two usual basal areas; first segment of abdomen very broadly sessile with the second, finely punctulate, second segment rather closely punctured; wings subhyaline, two submarginals.

Head considerably broader than long, broadly rounded and truncate behind, provided with fine scattered punctures, ocelli moderate, the hind ones as far from each other as from the eyes; a deep puncture but no furrow midway between the antennæ and the front ocellus; antennæ concolorous, the scape finely and densely punctulate; mandibles with tip blackened and with the basal tubercle

obsolete. Thorax broadly oval, pronotum finely rugosely punctured, subtransverse in front, the humeri broadly rounded; mesonotum closely and deeply punctured, the grooves vanishing on their forward fourth, scutellum coarsely metanotum rather finely reticulate over all; mesopleuræ contiguously punctured, mesosternum simple. Abdomen short, the first segment broader than long, very broadly sessile with the second, finely punctulate, second segment moderately punctured over all, remaining segments minutely closely punctulate and provided with rather denser simple hairs. Venter of abdomen punctured as above. Legs short, femora and tibiæ more or less castaneous, tibial spurs dull testaceous. Wings hyaline, veins testaceous, clearly cut, stigma castaneous, marginal cell short and broad, second submarginal short, receiving its recurrent nervure at the basal third, an extremely faint indication of a short third submarginal can be seen.

Length, 7 mm.

Fig. 46; occiput.

One male. Texas. The part of the State is not indicated. From the collection of the Museum of Comparative Zoology, Cambridge, Massachusetts.

This species is near *hyalina* Blake, but differs in the stronger punctuation of the abdomen and in the lack of the third submarginal cell.

Females.

The addition of a number of species makes the following modification of the table on page 261 of service. The edentate specimen of *simillima* has been included, as the previous tables would lead it to this place.

Insect more or less clothed with appressed pubescence in addition to longer erect hairs.....2.

Insect with no appressed pubescence, with erect hairs only.....6, etc.

2. First flagellar joint subequal to second and to scape.....2a.

First flagellar joint longer than second or scape.....3.

2a. Second dorsal with appressed and erect pubescence.....2b.

Second dorsal with erect hairs only.....**hypermnestra** Fox.

2b. Head and thorax rugosopunctate, the thorax coarser than the head; thorax rounded; abdomen not ornate.....2c.

Head and thorax finely punctured, the thorax finer than the head; sides of metathorax sharp, thorax quadrate; second dorsal with two rounded patches of white hairs.....**aprica** sp. n.

2c. Mandibles short, bidentate at tip; pubescence long; pygidium less prominent; humeri dentate.....**venenaria** sp. n.

Mandibles edentate but with a basal tubercle on outer side; pygidium distinctly margined.....2d.

2d. Pygidium with fine, deep, longitudinal striæ; pubescence short; apical half of abdomen blackish; humeri rounded.....**impar** sp. n.

Pygidium faintly granular; insect ferruginous; pubescence moderately long; humeri dentate.....**pervaga** sp. n.

3. Pubescence scarlet, grading into fulvous in some specimens. **anthophoræ** Ashm.
Pubescence pale golden in large part.....4.
4. Sides of thorax, abdomen and legs black; thorax somewhat elongate and pyriform; pubescence rather coarse; length, 12 mm..**auraria** Blake.
Greater part of body reddish; thorax shorter, more quadrate; pubescence silky; smaller species.....5.
5. Thorax anteriorly a little wider than the head, ground color fusco-ferruginous. **aspasia** Blake.
Thorax narrower than the head.....5a.
5a. Abdomen with a basal triangular black spot and black apex, pubescence not glistening; legs black.....bidentate variety of **similiima** Smith.
Abdomen ferruginous, at most piceous apically, pubescence dense; legs at most fuscous.....**phædra** Blake.

87. **Mutilla venenaria** sp. nov.

Female. Testaceous rufous, pubescence long but not thick; mandibles bidentate at tip; eyes facetted; thorax quadrate, humeri dentiform, metathorax truncate; abdomen ovate, petiole sessile, second and third segments each with two ovate semitranslucent spots; pygidium rounded.

Head quadrate, rounded behind, not carinate, rugoso-punctate; eyes irregularly rounded, distinctly facetted; clypeus shallow, slightly convex; under side of head polished, impunctate; antennæ black, scape and pedicel reddish, scape stout, sparsely bristly, pedicel equal to the flagellar joints individually; mandibles short and robust, tipped with two stout black teeth; palpi piceous. Thorax subquadrate, sides rounded, truncate in front with humeri dentate, narrowed behind, metathorax obliquely truncate, rounded into the mesonotum; dorsal surface coarsely reticulate, becoming finely punctate in front of the abdomen; mesopleuræ reticulate, metapleuræ smooth. First segment of abdomen short, broadly sessile with the second, its punctuation fine above and below, not carinate ventrally; second dorsal with two large, approximated, oval, discal spots of varying testaceous color; third dorsal also with two rounded semitranslucent spots, more widely separated, and placed on the strigose anterior portion; on the area of separation is the well-marked quadrate speculum, which from its reflections gives to the segment the appearance of having a median light or dark fleck when the abdomen is drawn out; punctuation of abdomen close and fine, punctuation of the second segment dorsally and ventrally somewhat stronger and more separated; last dorsal segment convex, not margined, polished. Legs rufous, the front femora and tibiæ piceous, tarsi piceous apically, spines and spurs poorly developed, yellow. Vestiture of the body consists of sparse appressed hairs, black on the mesonotum and second dorsal segment, yellow and matted on the head, and of erect dusky hairs. The erect hairs of the head and mesonotum are short, of the pronotum, metathorax, petiole and apical and ventral segments of abdomen long and comparatively dense, though not thickly so; ventrally the hairs become whitish; apical margins of segments of abdomen finely fringed.

Length, 4-5 mm.

Fig. 35; petiole.

Four females. Fedor, Texas (Birkman). One dated April 29, 1898. Types in collections of Mr. Birkman and the writer.

Judged by its poorly defined pygidium, this species would be grouped with the species about *balteola*, but as it has no other relationship with these, and is obviously allied to the new forms here grouped about it, it is placed with them in the group *anthophoræ* of Mr. Fox.

88. **Mutilla impar** sp. nov.

Female. Ferruginous, closely punctured, nearly bare, apex of abdomen black, head rounded, eyes irregularly rounded, poorly facetted, polished, mandibles edentate, thorax elongate oval, raised posteriorly, metathorax rounded, first and second segments of abdomen broadly sessile, pygidium strongly striated, rufous.

Head ferruginous, round, not carinate, closely punctured, more sparsely and minutely beneath, pubescence sparse and short, yellowish; eyes irregularly rounded, convex, scarcely facetted, polished; clypeus entire; mandibles triangular in section, straight on outer part, pointed, thick basally due to a tubercular projection on outer side, tips blackened, mandibular hairs and mystax long but sparse, palpi pale yellow; scape about equalling the length of the mandible, rather thick, twisted, punctulate, nearly glabrous, pedicel slightly shorter than the nearly equal flagellar joints, the last joint one-half longer than the others. Thorax elongate ovate, equal in width to the head, its pubescence inconspicuous, concolorous, the punctuation stronger but not so close as on the head, humeri rounded, metathorax rugoso-punctate, the disc with longer erect yellow hairs, sides rounded. At the raised posterior part of the mesothorax the rugose punctures take on the character of scales in the largest specimen. Pleuræ punctured as on the dorsulum in front, posteriorly smooth and shining. Abdomen slender, finely punctured, petiole broadly contiguous with the second segment, ventral keel inconspicuous, pubescence of first segment erect, silvery, moderately dense, of second segment short, appressed, sparse, black except for two lateral spots of denser silvery hairs In one of the smaller specimens the pubescence of this segment is denser and dusky, not black, and the lateral spots are wanting. Second, third, fourth and fifth segments fringed with whitish pubescence; first and second segments concolorous with the head and thorax, remainder of abdomen except the prominent rufous pygidium black, pygidium sharply margined and deeply longitudinally sulcate. Legs testaceous, the apices of the tibiæ piceous, posterior tibiæ fringed with yellow bristles and hairs, spurs not lengthened.

Length, 4-7 mm.

Fig. 36; petiole.

Two females, 4 and 7 mm., Fedor Tex., May, 1901 (Rev. G. Birkman).

Var.: tooth on outer side of mandible wanting, pygidium finely granular, second abdominal segment without the lateral patch of silvery pubescence, otherwise identical. Length, 4 mm.

One specimen, Fedor, Tex., April 28th (Rev. G. Birkman).

89. **Mutilla pervaga** sp. nov.

Female. Entirely rufous except the antennæ and posterior legs, which are tes-

taceous; head rounded, eyes facetted, mandibles short, strong and pointed, flagellar joints subequal; thorax quadrate, coarsely rugose; first abdominal segment sessile, pygidium granular; pubescence sparse, the erect white hairs moderately long.

Head rounded, closely punctured, pubescence very sparse, yellowish, eyes irregularly rounded, facetted and polished; mandibles short, stout at base, edentate, sharply pointed, tips black; scape short, nearly glabrous, pedicel but little shorter than the flagellar joints, which are all very nearly equal in length. Thorax quadrate, longer than wide, not constricted and but little narrowed posteriorly, front angles prominent, metathorax declivous but rounded into the mesonotum, its pubescence longer, dusky white; mesonotum coarsely rugoso-punctate becoming transversely rugose posteriorly; metanotum rugoso-punctate, smooth at apex; pleuræ highly polished and smooth on posterior half, anteriorly punctate; pubescence of thorax consisting of inconspicuous appressed whitish hairs and longer though not long white marginal pile. Abdomen rather closely and deeply punctate, the punctures of the second segment distinctly separated; vestiture whitish rather long at base and on apical segments; first ventral simply carinate; pygidium margined, finely granular. Posterior legs becoming testaceous apically; hairs of posterior tibiæ much finer than the spines, which themselves are only moderately developed; tibial spurs testaceous.

Length, 4.5 mm.

Fig. 37; petiole.

One female. Fedor, Texas (Rev. G. Birkman). No date.

This species resembles *venenaria*, but is readily distinguished by the form of the mandibles and of the pygidium.

90. **Mutilla aprica** sp. nov.

Female. Testaceous, finely punctured species, clothed with sparse, appressed and erect pubescence, that of the second abdominal segment arranged in two silvery patches; head rounded, eyes oval, facetted, mandibles edentate, first flagellar joint but little longer than the second; thorax quadrate, metathorax abrupt, crenulate laterally; first and second abdominal segments broadly sessile, pygidium prominent.

Testaceous, head rounded, as wide as the thorax, rather closely and finely punctured, pubescence blackish and sparse, the erect hairs cropped, angles not carinate or dentate; clypeus shallowly convex, mystax long but scattered; eyes oval, rounded, facetted, dull; antennæ testaceous, scape short, punctured closely, hairs almost wanting, pedicel subequal to second flagellar joint, first joint slightly longer; mandibles slender, pointed, sickle-shaped, apical third black, along the sides are several prominent hairs. Thorax quadrate, flattened, but little constricted posteriorly, punctured like the head but more sparsely, pubescence silvery, short, more or less sparse and appressed, marginal hairs long, erect; metathorax abruptly declivous, smooth and polished except where it meets the mesonotum, where it is reticulate, as usual; pleuræ entirely smooth, polished. Abdomen elongate, minutely punctured, first and second segments sessile, the carina of the petiole slight, first and apical segments with long whitish hairs, pubescence of second segment black medially outlining two ovate patches of denser silvery pubescence, apical margin fringed with silvery, pubescence of

venter sparse; pygidium flattened broad at the tip, minutely granular. Legs testaceous, tibial spurs long, whitish, tibial spines yellow, poorly developed.

Length, 4 mm.

Fig. 38; petiole.

Three females. Fedor, Lee Co., Texas. May and October, 1899 (Birkman).

This species superficially resembles *scævolella* Ckll. and Casad., but is easily recognized by the sparse black hairs of the head.

91. * **Mutilla phædra** Blake (154).

One specimen, from Marble Falls, Texas, November 11, 1899, differs in the erect hairs being white instead of golden.

Group *hexagona.*

92. **Mutilla hexagona** Say (161).

Wood's Hole, Mass.; Kansas (Westcott); Nebraska (M. C. Z.); Fedor, Texas (Birkman).

93. **Mutilla dubitata** Smith (162).

Wood's Hole, Mass.; Bath, Illinois, August; Virginia, Kansas (M. C. Z.); Columbus, Texas (Cockerell) = var. *dubitata.*

Fedor, Texas, April–October (Birkman); Idaho (M. C. Z.); Mesilla Park and Organ Mountains, New Mexico (Cockerell) = var. *ornativentris* Cresson (fig. 40; petiole).

This species is remarkably variable in color, size and structure. The sculpture of the pygidium is subject to variation. Normally the silvery markings of the second segment of the abdomen are linear; two females from Mesilla Park, N. M., and Santa Rosa, Mexico, have these spots ovate. Not rare.

94. **Mutilla nestor** Fox (163).

This species was common during June, 1900, at Galveston, Texas, flying over flowers like the males of the group *Sphærophthalma.* It occurs off the Coastal Plain at Fedor, Texas, also.

95. * **Mutilla Grotei** Blake (164).

The Museum of Comparative Zoology contains this species from Texas.

96. **Mutilla promethea** Blake (165).

A single male was taken at Fedor, Texas, by Mr. Birkman.

97. * **Mutilla Sayi** Blake, var. *hollensis*, var. nov.

Several males collected during different years at Wood's Hole, Mass., differ from the western form of *Sayi* in their coarser sculpture, although agreeing in color. They may be described as follows:

Head densely but finely punctured; antennæ black, the scape clothed with short blackish pile and with a rufous apex, third and fourth joints of antennæ equal. Mesothorax with five impressed smooth lines, the median one cuneiform and extending only a short distance in back of the collar, the intermediate pair entire, deep, the outer pair abbreviated anteriorly; scutellum reticulately punctured, the reticulation of nearly the same structure as the punctures at the hinder portion of the mesothorax; dorsal groove of the metathorax short, extending less than one-half the way to the middle; tegulæ impunctured, polished. First segment of abdomen black, closely punctured, its ventral keel acutely produced in front and angulate near the middle, second segment testaceous, finely and remotely punctured on the disc, laterally and apically the punctures become stronger and denser, and on the impressed apical margin become minute and dense, almost scabrous. The impressed margin and the remaining segments of the abdomen are darker ferruginous. Pubescence arising from the ferruginous chitin black, except that of the last two segments and the venter, which is whitish.

Specimens of *Sayi* from Nebraska are in the collection of the Museum of Comparative Zoology. A light-colored specimen was found flying in a gravel-pit in Lake County, Ill., September. *Curiniceps vesta, ferrugata* and *sparsa* were the only females discovered in the vicinity after diligent search. Can this be the male of one of these?

Group *scrupea*.

98. **Mutilla scrupea** Say (171).

Texas (Museum of Comparative Zoology).

99. **Mutilla copano** Blake (172).

Texas (M. C. Z.)

100. **Mutilla susura** sp. nov.

Male. Robust, coarsely punctured, head and thorax black, with short griseous pubescence, abdomen rufous, eyes deeply emarginate, petiole of abdomen short, constricted, black, legs and antennæ black.

Head small, narrower than the thorax, coarsely, confluently and rugosely punctured, clothed with sparse, irregular, short, whitish hairs, ocelli small, eyes large, strongly emarginate in front; antennæ short, stout, black, the scape nearly impunctate; mandibles but little reddish apically, short and stout, a prominent tubercle at their base. Thorax robust, wide at the tegulæ, narrowed before and behind, the sides of the anterior portion not curved, humeri dentiform, the front edge of the large prothorax broadly and shallowly excavated; prothorax and mesothorax and scutellum very coarsely, deeply, rugosely punctured, metanotum

coarsely reticulated, its shallowly pitted posterior face abruptly declivous; tegulæ very large, scoop-shaped, punctulate, black, and slightly hairy; mesopleuræ coarsely punctured, with almost sericeous pubescence. Petiole of abdomen short, transverse, black, its forward portion abrupt, shallowly excavated, glabrous and polished, its posterior part more or less cylindrical, strongly punctured and covered with sericeous yellowish pubescence, ventrally the petiole bears a prominent carina terminating anteriorly as a strong tooth; second segment uniformly but strongly punctured, its hairs dusky, becoming yellowish, short and sparse, fringed apically with deep honey-yellow short hairs; remaining segments more finely punctate, the discal hairs longer and deeper yellow, not fringed; ventral segments sculptured as above, their hairs whitish; pygidium unmargined, but with a strong median keel extending over two-thirds its length, apical hooks ferruginous. Legs short, slender, black, their pubescence and tibial spurs griseous. Wings short, not extending beyond the third abdominal segment, fuliginous, the base somewhat paler, provided with hyaline markings as follows: one transverse streak in the first submarginal cell, one oblique in the second, two dots in the obsolete third, and one longitudinal streak in the obsolete outer discoidal; veins narrow, black, stigma minute.

Length, 7 mm.

One specimen, collected by the writer at Galveston, Texas, June 7, 1900.

This species is a near relative of *copano* Blake, differing mainly in the coarser sculpture of the second abdominal segment.

101. **Mutilla puteola** Blake (174).

Fig. 41; petiole.

Several females from Fedor, Texas (Birkman), May 13–17, 1899. All measure 3.5 mm.

102. **Mutilla sudatrix** sp. nov.

Female. Head thickly covered with short appressed golden pubescence, second abdominal segment with two discal spots of whitish pubescence, its apical margin with a clear-cut white band interrupted at the middle, punctures deep.

Castaneous. Head rounded, lighter in color than the body, almost ferruginous, the vertex equalling the width of the thorax, occiput hemispherical, closely and rather deeply punctured, but the sculpture concealed beneath the dense, matted, golden pubescence which covers the whole upper surface and extends more sparsely on the sides; eyes large, elongate-ovate, the ommatidia distinct; clypeus slightly emarginate in the middle; cheeks with an obtuse tooth within; antennæ entirely ferruginous, scape short, slightly curved towards tip, in length two-thirds the width of the front, punctulate, covered with sparse yellowish hairs, basal joints of flagellum subequal in length. Mesothorax nearly uniformly rounded, slightly more declivous in front, closely, deeply and regularly punctate, provided with sparse, scattered, decumbent, yellowish pubescence and a few erect, dusky hairs; seen from above, the humeri, propleuræ and metapleuræ are sericeous; no scutellar scale. Petiole short, transverse, quadrate, impunctate except for a single transverse central series of deep setigerous punctures, no

ventral carina developed, clothed above with a mat of silvery pubescence; second abdominal segment closely, deeply and uniformly punctured, the punctures slightly deeper than those of the thorax. In *puteola* the punctures are relatively more distant and less deep. On each side of the middle of the basal third of this segment is an elliptical sericeous spot; the hind margin for a distance of one-sixth the segment closely fringed with sericeous white pubescence which extends forward along the lateral margins; elsewhere the appressed pubescence of this segment is black and sparser, becoming dirty yellow on the anterior portion; the scattered erect hairs conform in color with the appressed pubescence out of which they arise; remaining segments with dusky hairs, the punctuation minute; no pygidium. Legs ferruginous, their bristles and hairs concolorous.

Length, 5.5 mm.

One specimen, collected by the Rev. G. Birkman at Fedor, Texas, May 16, 1899.

This species is closely related to *puteola* Bl., differing by its larger size, stronger punctuation and more ornate marking.

THINNINÆ.

Genus **CHYPHOTES** Blake.

103. **Chyphotes Belfragei** Blake (5).

Fedor and Austin, Texas, and one large specimen from Mesilla Park, New Mexico. Not rare. We have taken this in spider-nests on window-sills, where they have become entangled during the night while seeking to approach the light.

104. **Chyphotes attenuatus** Blake (8).

Mesilla Park and Santa Fé New Mexico. Also found at light at Arrogo, New Mexico. Not rare. This belongs to the recently erected genus *Typhoctes* Ashmead. The fore wing is represented in fig. 63.

105. **Chyphotes Heathii** sp. nov.

Male. Very slender, pale castaneous, legs concolorous, metathorax with fine papillæ at the junctures of the usual reticulum which is absent, wings clouded beyond the cells, stigma large, saturate, three submarginals, the outermost quadrate.

Whole insect castaneous except the black ocelli and eyes and the fuscous flagellum. Head ovate, much produced behind, very sparsely punctulate, mandibles brownish at tip; eyes large, round, subemarginate behind, the facets minute but distinct; scape yellow, shorter than a flagellar joint, the pedicel yellow, one-third the length of the next joint, antennæ as long as the head and thorax. Prothorax finely but unevenly punctured, mesothorax shining, finely punctate, with two lateral grooves; scutellum impunctate except for a marginal row of setigerous punctures; metathorax irregularly roughened, provided with fine tubercles which appear to mark the junctures of the absent reticulum, posteriorly the

network is faintly indicated, pleuræ shining more or less, punctured. Petiole occupying more than one-third the length of the whole abdomen, coarsely punctured above, rugose beneath, much swollen on outer half and constricted at tip, second segment with finer punctures, remainder impunctate. Legs slender, posterior femora subfuscous, tibial spurs reddish. Wings hyaline basally, suddenly infumated beyond the marginal cell, veins fuscous, stigma broad, longer than the marginal cell, fuscous, marginal cell narrow, round apically, three submarginals, the second broad at the top, the third quadrate, but both its transverse veins sinuous.

Length, 9.75 mm.

Fig. 61; fore wing.

One male, collected by Dr. Harold Heath, May, 1901, at Pacific Grove, Cal., to whom the species is respectfully dedicated. Type in writer's collection.

106. * **Chyphotes nubeculus** Cresson (10).

Seven specimens, from Denver, Colorado; Las Cruces, San Marcial, Santa Fé, and Arrogo, New Mexico (Cockerell).

Taken at light.

107. **Chyphotes peculiaris** Cresson (11).

This brilliant insect was received from Professor Cockerell from the College campus at Mesilla Park, New Mexico. September.

Dr. Ashmead has made this species the type of his genus *Typhoctes*.

Genus **BRACHYCISTIS** Fox.

108. **Brachycistis idotes** Cockerell (2).

Fig. 62; wing.

Las Cruces, New Mexico, one specimen.

109. **Brachycistis elegantulus** Cockerell and Casad. (9).

Arrogo, ten miles west of La Luz, not far east from Tallarosa Road, New Mexico, August 23d, at light. It may be here mentioned that all references to Arrogo in this paper indicate this place and date. The insects were collected by Mr. C. H. Townsend and contributed by Mr. Cockerell.

110. **Brachycistis inæqualis** Fox (10).

Two specimens, sent by Professor Cockerell as collected at Saint Augustine, New Mexico, differ slightly among themselves and from the description of *inæqualis*. Although these differences may appear striking, it seems well not to regard them as belonging to different species, in view of their otherwise similar structure, size, and con-

tour of body. Moreover, as they were taken together, the differences in this case do not seem to be of specific value. Briefly, the points of difference between the two individuals may be stated thus:

a. Head brown; ocelli large, the distance between the eye and hind ones less than the diameter of an ocellus; stigma fuscous, marginal cell projecting beyond the stigma by nearly the width of the latter.

b. Head concolorous; ocelli small, the distance between the eye and the hind ones considerably greater than the diameter of ocellus; stigma black, marginal cell projecting from it by less than one half the width of the stigma.

These specimens differ from the description of *inæqualis* as follows: antennæ not darker; marginal cell longer, second submarginal longer than the third, third submarginal subquadrate, but higher than long.

The petiole of the abdomen is highest just behind the middle, and then is flattened to the tip, which seems to be different from the conformation in *inæqualis.* Until the specimens are compared with the types of Mr. Fox's species it would be unwise to found another species on them.

111. **Brachycistis glabrella** Cresson (12).

Twenty-two specimens, variable in the length and shape of the petiole of the abdomen. Alberquerque, Silver City, Arrogo, and Organ Mountains, New Mexico, taken at light (Cockerell); New Mexico, Texas (M. C. Z.).

112. * **Brachycistis castaneus** Cresson (14).

"Texas" (Chicago Acad. Sci.); Mesilla Park, La Cueva, Silver City, Deming, Arrogo, New Mexico (Cockerell). At light. Numerous specimens.

113. * **Brachycistis indiscretus** Fox (16).

Eight specimens, taken at light at Mesilla Park, May (Cockerell), appear to belong here. The variability lies in the sculpture of the mesonotum, which is generally very finely granular and with a broad, shallow dorsal groove, and in the neuration of the wings. The third submarginal is inconstant as to form, ranging from a nearly closed circle to a subquadrate cell larger than the second submarginal.

114. **Brachycistis cremastogaster** sp. nov.

Male. Head castaneus; thorax, abdomen, legs and antennæ pale rufous, pubescence rather sparse, dusky; ocelli large, the hind ones nearer the eyes than their diameter, the distance between them twice their diameter, their hind edges connected by a deeply impressed line; clypeus slightly and broadly produced at the middle; antennal scape subequal to length of flagellar joints, punctures of head sparse and fine, occiput but little produced and truncate. Mesonotum and scutellum with fine scattered punctures, mesosternal punctures slightly stronger, mesopleural punctures close; metathorax smooth above, very slightly roughened, almost smooth, posteriorly. Petiole of abdomen campanulate, strongly nodose, depressed above, constricted from the second segment, but little longer than its greatest breadth, impunctate except for a set of close punctures posteriorly on the sides, ventral segments somewhat darker. Femora rufo-castaneous, tibiæ and tarsi more or less pale. Wings clear hyaline, veins testaceous, stigma fuscous, marginal cell somewhat more than two-thirds the length of the stigma, second submarginal triangular, its sides ending near the base of the marginal, its length on the cubital less than the length of the trapezoidal third cell, third submarginal longer than high.

Length, 10 mm.

Two specimens, indefinitely labelled "Texas," from the Andrew Bolter collection in the Chicago Academy of Science.

This species will lead to *triangularis* Fox in Mr. Fox's table, but it differs from the description of that species thus: pubescence sparse, almost wanting; metathorax nearly smooth; petiole impunctate except posteriorly on the sides, where it is finely punctured; third submarginal longer than high and longer than the second. The head is darker, and the size much larger.

115. **Brachycistis Gaudii** Cockerell.

Fig. 64; fore wing.

One specimen, La Jolla, California.

Genus **MYRMOSA** Latreille.

116. **Myrmosa unicolor** Say (1 and 4).

Myrmosa unicolor Say. ♂.

Myrmosa thoracica Blake. ♀.

The males and females occur in the same fields at Wood's Hole, Mass., the males frequently hovering over the flowers, the females running about on ground riddled by the nests of *Halictus*. The females were common throughout the present summer in a gravel pit in Lake County, Ill. The ground here was riddled with nests of *Halictus spp.* and various wasps. See fig. 66 for venation.

Genus **METHOCA** Latreille.

117. **Methoca stygia** Say (1).

Fig. 65; wing.

Not rare on Umbelliferous flowers at Wood's Hole, Mass.

118. **Methoca bicolor** Fabr. (3).

A single specimen in a gravel-pit, Lake County, Ill. August.

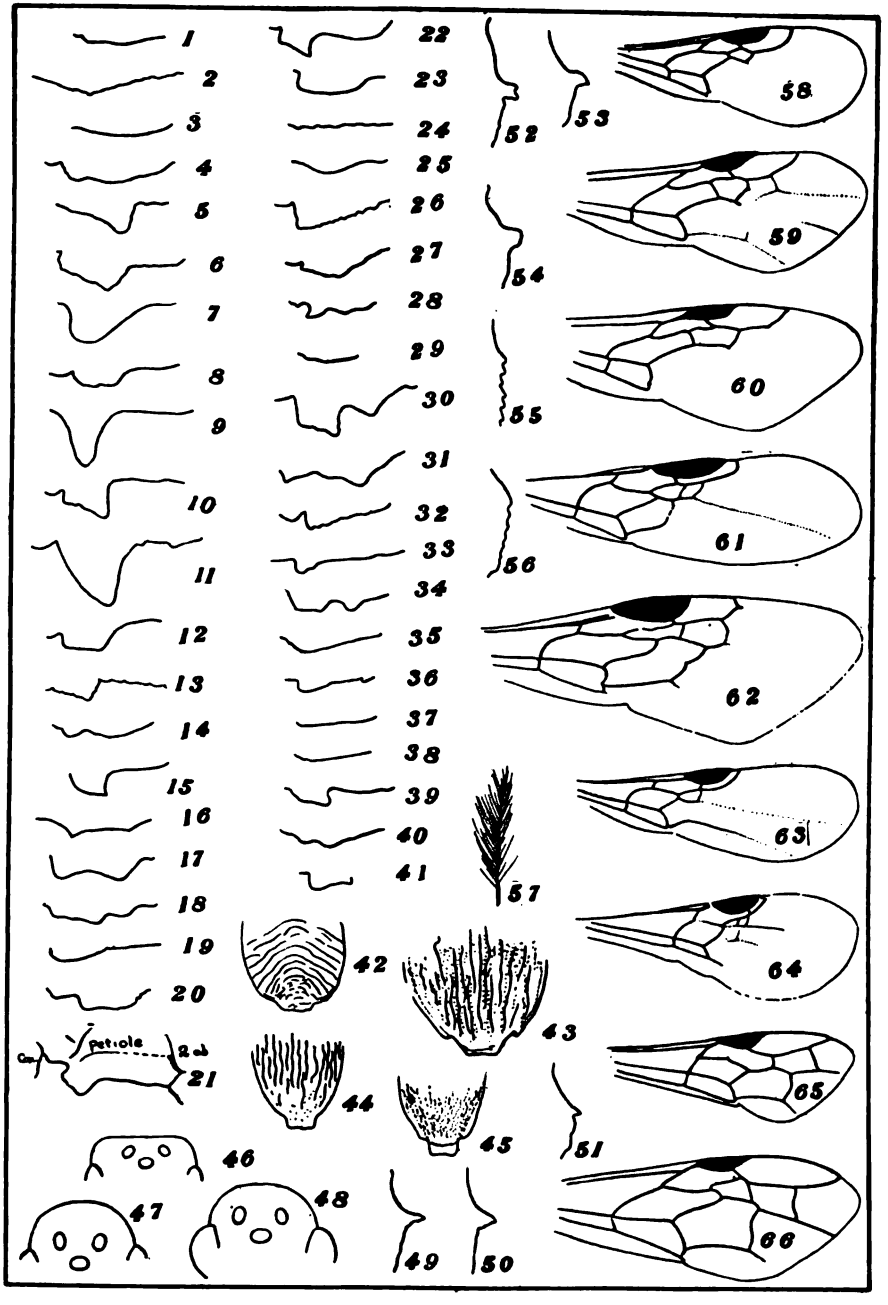
119. * **Methoca californica** Westwood (4).

Several specimens, from Fedor, Texas (Birkman), agree with Westwood's description. Another specimen, from Pistakee Lake, Ill., is exactly similar. September.

While the press-work was being done, two species were obtained in a gravel quarry in Northern Illinois which are not here noticed. These are *cariniceps* Fox and *sparsa* Fox, and both have their distribution materially extended by this discovery. This makes a list of one hundred and twenty-one species studied.

EXPLANATION OF PLATE IV.

Fig. 1. Profile of first ventral abdominal segment of *simillima*, ♀.
Fig. 2. Same of *brazoria*, ♀.
" 3. " *waco*, ♀.
" 4. " *harmonia*, ♀.
" 5. " *gloriosa*, ♀.
" 6. " *pseudopappus*, ♀.
" 7. " *magna*, ♀.
" 8. " *erudita*, ♀.
" 9. " *occidentalis*, ♀.
" 10. " *comanche*, ♀.
" 11. " *orcus*, ♀.
" 12. " *medea*, ♀.
" 13. " *ægina*, ♀.
" 14. " *electra*, ♀.
" 15. " *ferrugata*, ♀.
" 16. " *vesta*, ♀.
" 17. " *vesta*, var. *b*, ♀.
" 18. " *vesta*, var. *c*, ♀.
" 19. " *cypris*, ♀.
" 20. " *infensa*, ♀.
" 21. " *chlamydata*, ♀.
" 22. " *texana*, ♀.
" 23. " *pœcilonota*, ♀.
" 24. " *Bollii*, ♀.
" 25. " *zelaya*, ♀.
" 26. " *obscura*, ♂.
" 27 " *californica*, ♀.
" 28. " *Foxii*, ♂.
" 29. " *Foxii*, ♀.
" 30. " *tisiphone*, ♀.
" 31. " *fulvohirta*, ♂.
" 32. " *balteola*, ♀.
" 33. " *pudica*, ♂.
Fig. 34. " *Birkmani*, ♀.
" 35. " *venenaria*, ♀.
" 36. " *impar*, type, ♀.
" 37. " *pervaga*, ♀.
" 38. " *aprica*, ♀
" 39. " *dubitata*, ♀.
" 40. " *ornativentris*, ♀.
" 41. " *puteola*, ♀.
" 42. Pygidium of *hippodamia*, ♀.
" 43. " " *chlamydata*, ♀.
" 44. " " *pseudopappus*, ♀.
" 45. " " *gloriosa*, ♀.
" 46. Head of *noctivaga*, ♂.
" 47. Head of *hebes*, ♂.
" 48. Head of *erebus*, ♂.
" 49. Profile of mesosternum of *hamata*, ♂.
" 50. Same of *erebus*.
" 51. " *trita*.
" 52. " *hebes*.
" 53. " *pudica*.
" 54. " *danaus*.
" 55. " *Cockerelli*.
" 56. " *simpliciventris*.
" 57. Hair from abdominal fringe of *Westcottii*, ♂.
" 58. Wing of *Mutilla grata*, ♂.
" 59. " " *bellerophon*.
" 60. " " *hamata*.
" 61. " *Chyphotes Heathii*.
" 62. " *Brachycistis idotes*.
" 63. " *Typhoctes attenuatus*.
" 64. " *Brachycistis Gaudii*.
" 65. " *Methoca stygia*.
" 66. " *Myrmosa unicolor*.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A MONOGRAPH OF THE NORTH AMERICAN PHORIDÆ.

BY CHARLES THOMAS BRUES, M. S.

The present work was begun several years ago, by Prof. J. M. Aldrich, of the University of Idaho, by whom all the material was collected. At that time a number of the new species were described, but owing to work on his catalogue of the North American Diptera, Professor Aldrich was compelled to discontinue work on the Phoridæ. At his suggestion, the collection was sent on to me, together with the descriptions of new species already prepared. In the text I have placed such descriptions in quotation marks and the initials J. M. A. after them in parentheses. This signifies that the original description was drawn up by Professor Aldrich.

The material was derived from various sources. A large portion of it was collected by Professor Aldrich in Dakota, Idaho, and at Lawrence, Kans. A large number of the eastern species were collected by Mr. C. W. Johnson, and many from the middle west by Dr. William M. Wheeler. Acknowledgments are also due to Dr. Garry de N. Hough for many eastern and southern forms, to Mr. A. L. Melander for Texan species, to the National Museum for the loan of some types, to the University of Kansas, Stanford University and Cornell University. Specimens have also been obtained from Dr. Nason, Dr. Kertész and Mr. Trevor Kincaid. The West Indian forms were loaned by the British Museum.

I have examined the types of Loew's species in the Museum of Comparative Zoology at Cambridge, the types of Prof. Aldrich's West Indian species (loaned by the British Museum), as well as the types of some species described by Coquillet and those by Lintner and Felt. An European collection identified by Strobl has been a great help in detecting the identity of certain American and European species.

A set of types of the new species described have been placed in the U. S. National Museum.

In conclusion I wish to express my most sincere thanks and appreciation to Prof. Aldrich for his many valuable suggestions and criticisms, as well as for his generosity in placing the collection in my hands.

The family Phoridæ form a very readily recognized group of flies. All are of minute or rather small size and extremely active. They separate themselves sharply from other Diptera by their peculiar antennæ and wings; the former consist of apparently a single joint which bears a long three jointed arista; the wings are provided with two distinct kinds of veins,—a series of very thick ones anteriorly, which reach only half way to the wing tip, and a series of three or four much lighter veins, which pursue a longitudinal course and are distributed over the discal portion of the wing.

There are known at the present time about one hundred and twenty-five species from various parts of the world. Of these about one-half are described from Europe alone, while the greater portion of the remainder belong to the North American Fauna. There is a close connection between the European and American species, many of them being common to both continents. From the large number of species that are found in every locality which is carefully examined, it is probable that the number of living forms is greatly in excess of those at present known, perhaps four or five times as great. Some of the well known species have a very wide distribution. A few of the forms originally described from Europe have since been found in practically all parts of the holarctic region. A wide distribution seems also to be the rule among the few tropical species which I have examined.

The members of the family are all small and many of them have a more or less hump-backed appearance, due to a great development and arching of the thoracic dorsum. The head is more or less rounded or hemispherical in shape; the compound eyes are well separated above and on the front, while the ocelli, which are absent only in some wingless forms, are placed in a triangle on the vertex. The front, which is from one-half to one-fifth the width of the head, is nearly always (except *Gymnophora* and *Platyphora*) provided with several transverse rows of strong marochætæ or bristles. The antennæ are placed in cavities at the lower edge of the front, their insertion varying greatly on account of the extreme difference in the length of the front in the various species. The antennal cavities are sometimes more or less coalescent, but usually remain separated as lateral depressions. The antennæ are composed of three joints; of these the first is exceedingly small, and the second is enclosed in the third, so that under an ordinary hand lens they

appear as single-jointed. The third joint is very large and generally sherical or oval in form, although in some genera (*Conicera*, *Hypocera* and *Melaloncha*, etc.) it may be elongated and drawn out into a point. The arista is composed of two short basal joints and a long, usually more or less plumose third joint; its insertion may be either dorsal or terminal. The palpi are nearly always large and clavate, with a series of strong bristles along their outer margin. In the males of some species the palpi are much enlarged, or they may be destitute of the characteristic bristles. The proboscis is usually of moderate size and soft consistency; in some forms, however, it is very strongly chitinized, and in a few others it is greatly elongated or swollen.

The thorax is well developed in the winged forms, and is often considerably arched above, so as to partly conceal the head; again, in the wingless females of some genera it is exceedingly small and often shorter than the head. The dorsum usually bears macrochætæ along the sides, medially behind and on the scutellum. The metathorax is very short.

The legs are large and strong and well adapted to jumping. The anterior coxæ are much elongated and more or less freely movable at the base. The four posterior ones are connate with the thorax. The femora, especially the hind ones, are often exceedingly stout and flattened. The tibiæ of all the legs may bear either rows of setulæ or large, strong, single, paired or serial macrochætæ on the outer side before the apex. Often part of the tibiæ and metatarsi are covered with close comb-like rows of flattened bristly hairs. These are very characteristic of the Phoridæ. Tibial spurs and tarsal claws are usually present, although the former may rarely be absent. The empodia and pulvilli are nearly always present, but are wanting in a few of the genera. Peculiar modifications of the legs are rare, and when they do occur apply only to the tarsi and femora. The femora may be extremely flattened, and the tarsi may be flattened or swollen. The wings are present in the males of all genera so far as is at present known, but are absent or very much reduced in size in the females of quite a large number of the genera. Their unique venation when present serves at once to distinguish them from any other known Diptera.

The wings are large and are folded flat on the back when not in use. The costa is thickened along its basal half to form

the costal vein. Below this is the first longitudinal, which remains separated from the costa until near its tip, where it curves upward and meets the costal vein; near the base of the wing it is connected with the costa by the short humeral cross-vein. Just beyond it and anterior to the first vein is the mediastinal or auxiliary vein, which is often obscure or completely absent in some forms. The third vein is usually quite stout, and meets the costa at its apex. The second vein is short (absent in many forms), and is an anterior branch of the third. It usually meets the costa near the tip of the latter. The costa is bristly except in a very few cases, as is also the root of the wing behind. The four discal veins are usually considered as the fourth to seventh longitudinal veins, and are always more delicate than the basal veins; occasionally the last (seventh) may be absent. As a rule, the wings are hyaline or but slightly colored, but in some few European species the anterior border is strongly infuscated. Peculiar wing pores have been described, which are upon the apical portion of the third vein.*

These pores are very numerous in *Phora pachyneura* Lw., in which case they extend over the apical three fourths of the third vein. The females of many genera have more or less vestigial wings. In such cases the venation is obscured or obliterated, and the wings often assume grotesque forms or are ornamented with enormous bristles (*e. g.*, *Acontistoptera* and *Xanionotum*); in another group of genera the females are completely destitute of wings. Even the halteres are wanting in some wingless females.

The abdomen is of the usual form, generally more or less conical in the female, and often with a conspicuous hypopygium in the male. The ovipositor of the female is generally soft and delicate,

* The following remarks upon the wing pores are from Felt, 10th N. Y. Rept. "An additional character which may prove to be of specific value is found in the number and location of certain 'pores' or pore-like structures. The pores, four in number (*i. e.*, in *Aphiochæta albidohalteris*), occur in a slightly curved row along the middle on the outer side of the second heavy vein, where it anastomoses with the costal vein; a short stump extends beyond the anastomosis and inclines a little away from the costa.

"The pores are less than half their diameter apart, the last one being close to the apex of the stump. Each consists of a depression, surrounded by a raised circular ring of chitin. These pores must not be confounded with the scars on the costal vein when a bristle is removed; they appear to have no connection with either bristles or setæ."

but in some forms (*e. g. Apocephalus, Melaloncha*) it is strongly chitinized and adapted to piercing.

The adult flies are very active and make but little use of their wings, using them only to fly for short distances. When in motion, they run about with a peculiar jerky, hopping motion which makes them readily recognizable at a glance. They may often be captured in sweepings from damp places, or running about on the ground among decaying leaves or near carrion. Very often they may be seen on windows. The numerous species which are parasitic on ants are usually seen only in or about the nests of their hosts.

The anatomy and transformations of the Phoridæ have never been described with any amount of detail. I give below the description of a larva which is a species of Phora that was found by Hubbard in the Mammoth Cave, Kentucky.

The larva is cylindrical, narrowed in front, more suddenly narrowed behind. Head small, rounded, convex, deeply inserted in the thorax; above, on each side, an acute, three-jointed tubercle; in front, a second pair of very minute tubercles, separated by a sutural line, which branches below them; space between the branches of the Y-shaped sutures excised, inclosing the buccal opening, which appears as a dark transverse slit. Three thoracic segments smaller than the abdominal segments, retractile, bearing at or near the anterior border a row of acute tubercles or spines; the prothoracic with a pair of tubular spines arising from depressions at the middle of each side. Abdomen of nine segments, each with three folds on the dorsal surface, the posterior fold bearing a row of spines, similar to those on the thorax; sides wrinkled, with tubercular prominences between the segments, and one or two spines anterior to those of the dorsal row; ventral surface, each segment with three tranverse ridges, one median, slightly in advance of the two lateral ridges; the last segments smaller, the terminal with an anal projection consisting of two large retractile tubercles, directed upward, and bearing spiracles, surrounded by six radiating spiny processes. Color dull white, darker at the extremities. The pupa is visible through the skin of the larva, which becomes an indurated puparium, light red in color, oval, pointed at the ends, smooth and convex beneath, more depressed on the dorsal surface, which is margined, with the segments indicated by ridges. The extremities of the puparium show the parts of the larva unchanged.

It appears from De Meijere's account (1901) that the larva of Lonchoptera, although quite different in external form from that of Phora, resembles it in many ways. Osten Sacken (1902) has also recently given reasons for considering the Phoridæ and Lonchopteridæ rather closer to the families included in his superfamily *Energopoda* than to any other Diptera. He states specifically, however, "A real *affinity* with *Phora* does not exist anywhere." De Meijere thinks, from a study of the larva of *Lonchoptera*, that the

latter should be placed as a family of Cyclorrhapha, close however to the Orthorrhapha. I have no evidence to add in support of either of these views, but am firmly convinced, from a study of the mouth-parts and head of *Lonchoptera* and *Phora*, that the two forms are more closely allied than has generally been supposed.

In the following list I have endeavored to give a number of the species of Phoridæ whose habits have been at least to some extent observed.

GENERAL.

Phora living in caves. Packard, Am. Nat., V, 1871, 745.
Also, Aldrich, 1896. (Probably *microcephala* Lw.)
Foul brood due to *Phora*. Bethune, 16th Rept. Ent. Soc. Ontario, 1886, 30,
Phorid larvæ emerging from a hornet after its death. (Verrall.)

SPECIFIC.

Phora bergenstammi Mik. In putrid snails (Mik).
Phora microcephala Lw. Lives on dead caterpillars, but is not a true parasite. (Hubbard and Riley.)
Phora opaca Meig. On exhumed human bodies.
Phora cimbicis Ald. Bred from cocoons of *Cimbex americana*.
Hypocera incrassata Meig. Parasite of honey-bee larva in England and cause of foul brood (Packard, 1868).
Aphiochæta agarici Lint. On decaying mushrooms (Lintner).
Aphiochæta epeiræ Brues. Bred from egg cocoons of the spider *Epeira* (Brues).
Aphiochæta fasciata Fall. In coccinellidæ which were feeding on *Aphides* (Rondani).
Aphiochæta flava Fall. Larvæ in *Agaricus* (Schiner).
Aphiochæta fungicola Coq. Bred from larvæ infesting fungi (Coquillet).
Aphiochæta lutea Meig. Larvæ in *Agaricus* (Schiner).
Aphiochæta minuta Ald. Bred from cocoons of *Cimbex americana* (Aldrich). In mushrooms (Howard).
Aphiochæta nigra Meig. In *Agaricus prunulus* (Schiner).
Aphiochæta pulicaria Fall. In nest of *Vespa germanica* (Van der Wulp). From *Agaricus* (Schiner),
Aphiochæta rufipes Meig. Quite a general feeder, Brunetti, Ent. Month. Mag., xxv, 1889, 282. In nest of *Vespa germanica*, Newstead, Ent. Month. Mag., xxvii, 1861, 41. From larvæ of *Nematus salicis* (Fitch).
Conicera atra Meig. On exhumed human bodies. On corpse, two years after burial, Webster (1890).
Trineura aterrima Fabr. On buried human bodies (Mégnin, 1895).
Apocephalus pergandei. Larvæ parasitic in the heads of adult ants (*Componotus*). Their presence causes the ant's head to drop off. Habits carefully described by Pergande (1901).
Syneura cocciphila Coq. Bred from larvæ infesting head of adults of *Icerya purchasi* (Coquillett).

Pachyneurella venata Ald. On dead shells (H. H. Smith).
Platyphora lubbocki Verrall. Myrmecophilous (Verrall).
Melaloncha (?) **formicarum** Verrall. Myrmecophilous (Verrall).
Psyllomyia testacea Lw. Myrmecophilous with *Dorylus*.
Commoptera solenopsidis Brues. Myrmecophilous with *Solenopsis geminata* (Brues).
Ecitomyia wheeleri Brues. Myrmecophilous with *Eciton*.
Ænigmatias blattoides Meinert. Myrmecophilous (Meinert).
Acontistoptera melanderi Brues. Myrmecophilous with *Eciton opacithorax*.
Xanionotum hystrix Brues. Myrmecophilous with *Eciton* spp.
Puliciphora lucifera Dahl. On flowers of giant *Arum* that smell like carrion.
Wandolleckia cookii. On land molluscs (*Achatina*), Cook.

It is evident, therefore, that the larvæ of many species live in decaying matter of a vegetable and animal nature; others are myrmecophilous, while a few have been observed as true parasites.

TABLE OF GENERA.*

1. Wings fully developed.....2.
   Wings absent or much reduced in size and venation.....14.
2. Third longitudinal vein forked near apex.....3.
   Third longitudinal vein simple, at most thickened at apex.....6.
3. Costal vein and front destitute of setæ.....**Gymnophora.**
   Costal vein and front provided with stout setæ.....4.
4. Anterior frontal setæ reclinate, middle tibiæ with one or more setæ on the outer side near the base.....5.
   Anterior frontal setæ reclinate, middle tibiæ destitute of such setæ, ovipositor hard and polished.....**Apocephalus.**
   Anterior frontal setæ proclinate, middle tibiæ destitute of such setæ. **Aphiochæta.**
5. Mediastinal vein present, proboscis normal, not greatly elongated..**Phora.**
   Mediastinal vein obsolete, proboscis of female very long and slender, pulvilli absent or obsolete.....Dorniphora.
6. Front wholly destitute of bristles.....Platyphora.
   Front provided with bristles.....7.
7. First longitudinal vein wanting.....**Ecitomyia** male.
   First longitudinal vein present as usual.....8.
8. Anterior frontal setæ reclinate, middle tibiæ with one or more setæ on the outer side near the base.....9.
   Anterior frontal setæ proclinate, middle tibiæ without such setæ.....12.
   Anterior frontal setæ absent, third antennal joint spherical, legs with no bristles except tibial spurs.....Chonocephalus, male.
9. Velvet black, middle tibiæ of the male with a row of long setæ on the upper side.....**Trineura.**
   Not velvet black, middle tibiæ with only two or three setæ besides those at apex.....10.

* Genera from all parts of the world are included in this table, the ones represented in North America being printed in heavier type.

10. Tibiæ with bristles on the outer side before the apex.....11.
Middle tibiæ without bristles before the apex, hind tibiæ fringed above with bristles.....**Melaloncha** gen. nov.
11. Male antennæ prolonged into a slender point, with apical arista. Female antennæ with a slight point where the arista is inserted at upper corner, seventh vein obsolete.....**Conicera.**
Third joint usually rounded in both sexes, seventh vein distinct. **Hypocera.**
12. Tibial spurs present on four posterior legs, well developed, hind tibiæ delicately spinulose.....**Syneura.**
Tibial spurs present only on hind legs.....**Pulicíphora** male.
Tibial spurs absent or obsolete, legs bare.....13.
13. Fourth, fifth and sixth veins light.....**Metopina.**
Fourth, fifth and sixth veins heavy.....**Pachyneurella** gen. nov.
14. Wings or halter-like appendages present, although of small size.....18.
Wings completely absent.....15.
15. Body when seen from above oval, cockroach-like...**Ænigmatias** female.
Body when seen from above constricted into the usual three parts.....16.
16. Abdomen of uniform texture, without more heavily chitinized dorsal sclerites, ocelli absent.....**Wandolleckia**, female.
Abdomen with four or more conspicuous, heavily chitinized dorsal sclerites, surrounded by a thinner membrane.....17.
17. Ocelli absent, also ocellar machrochætæ, abdomen with six dorsal sclerites, and one ventral one, the sixth.....Chonocephalus, female.
Ocelli present, four dorsal abdominal sclerites.....**Pulicíphora**, female.
18. Abdomen much swollen, the last three segments small and directed forward under the basal ones.....Termitoxenia.
a. Arista simple, finely pubescent, thoracic appendages straight, club-shaped and flattened, oviparous.....sub-gen. Termitoxenia.
b. Arista branched, not pubescent, thoracic appendages poorly developed, hoe-shaped or styliform; viviparous.....sub-gen. Termitomyia.
Abdomen often swollen, but of normal form; posterior segments never directed forward.....19.
19. Proboscis longer than the head and geniculate, abdomen fully chitinized throughout.....Psyllomyia, female.
Proboscis shorter than head height, abdomen at least in part membranous..20.
20. Wings very small, strap-shaped; often bearing long bristles.....21.
Wings larger, indistinctly veined, more or less triangular in shape. **Commoptera**, female.
21. Wings not bearing long bristles, abdomen without large macrochætæ. **Ecitomyia**, female.
Wings with very long bristles, head much wider than thorax, abdomen often with large macrochætæ.....22.
22. Head transversely arcuate, abdomen bare, wing bristles very long and stout. **Acoutistoptera**, female.
Head sub-triangular, abdomen with many very long macrochætæ arranged in transverse rows.....**Xanionotum**, female.

PHORA Latr.

1804. Latreille, Hist. Nat. des Ins. et Crust., 1804, XIV, 394.
1794. Fabricius, Ent. Syst. IV, *Musca, Tephritis, Bibio.*
1823. Fallen, Phytomyzides, *Trineura.*
1804. Meigen, Classif. I, *Trineura.*
1830. Meigen, Syst. Beschr. VI, *Phora.*
1848. Zetterstedt, Dipt. Scand., *Trineura.*
1856. Rondani, Prodromus, I, 136, *Palpimega, Megaselia, Triphlebia.*
1861. Lioy, Atti. Inst. Venet., 1864, *Phora, Trisometopia.**
1901. Becker, Monog. Phoridæ, 6.

GENERIC CHARACTERS.

Body rather stout, thorax and abdomen stout, well developed. Abdomen with six segments besides a large hypopygium in the male, and a three-jointed exsertable ovipositor, which is never strongly chitinized or horny in the female. Head hemispherical, the front usually broader than long, with four transverse rows of bristles, all of which are reclinate; upper three rows each consisting of four bristles, lower row with only a single median pair. Eyes widely separated, more or less pubescent; ocelli present. Cheeks and palpi bristly, the latter often enlarged in the male and less bristly than in the female. Third antennal joint spherical or egg shaped, with dorsal arista. Legs stout, the hind femora usually thickened. Hind tibiæ almost always with from one to seven stout macrochætæ on the outer side before the apex, spurs present on the four hind tibiæ. Wings large, mediastinal vein distinct, third longitudinal vein forked near the apex, costal vein bristly, posterior wing margin bristly at the root of the wing.

Table of Species.

1. Wings with four delicate longitudinal veins ..... 4.
   Wings with only three distinct light veins ..... 2.

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* The species which Lioy chose as type for the genus *Trisometopia* according to Becker's identification belongs to the present genus in which all the frontal bristles are reclinate. From Lioy's description one would be inclined to place it elsewhere, but I have placed it here, as the type designated by Lioy belongs to this genus. From the aggregation of types which Lioy indicates for the genus *Phora*, it is evident that he either had a very confused idea of the characters of the species enumerated or was working with wrongly determined specimens. The first, *P. flavicornis* Macq., = *maculata* Meig., is a true Phora; the second, *P. fuliginosa* Meig., is a synonym of *Gymnophora arcuata* Meig., and some of the others belong to other genera.

2. Third longitudinal vein black, much thickened, at its middle stouter than the costal vein, hind tibia with no seta on outer side near base. **pachyneura** Lw.
   Third longitudinal vein fuscous, not unusually thickened ..... 3.
3. Fourth vein recurved at the tip, ending as far from the wing tip as the fifth. **microcephala** Lw.
   Fourth vein straight at apex, ending much closer to the wing tip than the fifth ..... **fratercula** sp. nov.
4. Thorax with a single pair of dorsocentral macrochætæ ..... 5.
   Dorsum with two pairs of dorsocentrals ..... **comstocki** sp. nov.
5. Halteres black ..... 6.
   Halteres yellowish or white ..... 8.
6. First, second and third veins ending very close together ..... 7.
   First and second veins far apart at apex as usual, costal cilia long. **grœnlandica** Lundbeck.
7. Front very coarsely punctured throughout ..... **cimbicis** Ald.
8. Hind tibiæ with four or more setæ on outer side, besides the apical spurs .. 9.
   Hind tibiæ with never more than three setæ on the outer side before the apex. These when present very strong ..... 13.
9. Setæ on hind tibiæ four or five in number, very fine and slender, not as long as the width of the tibia ..... 10.
   Setæ on hind tibiæ very long and unusually stout, equalling the apical spurs in size ..... 11.
10. Legs and pleuræ yellowish ..... **incisuralis** Lw.
    Legs and pleuræ black or piceous ..... **nitidifrons** sp. nov.
11. Front tibiæ with two serial unpaired setæ near the middle of the outer side, posterior tibiæ usually with seven or more long setæ, abdomen wholly black ..... **spinipes** Coq.
    Front tibiæ with a single seta on outer side before the apex ..... 12.
12. Hind tibiæ with five long setæ on the outer side, the first two being paired and the others serial, abdominal segments with narrow, pale apical borders ..... **scutellata** sp. nov.
    Hind tibiæ with four setæ, a pair at basal third, one at apical third and one just before the tip. Abdomen black ..... **thoracica** Meig.
    Hind tibiæ with a pair at basal third and a pair just before the tip. **luggeri** Ald.
13. Hind tibiæ with one or more stout setæ on outer side before the middle .. 14.
    Hind tibiæ destitute of such stout setæ on outer side before the apex ..... 17.
14. Hind tibia with one stout seta on outer side below the knee ..... 15.
    Hind tibiæ with two stout setæ on outer side before the middle ..... 16.
15. Head and thorax yellow, middle and hind tibiæ with transverse comb-like rows of short black hairs ..... **multiseriata** sp. nov.
    Head and thorax black ..... **venusta** Coq.
16. Head black, thoracic dorsum and three apical segments of abdomen rufous. **olympiæ** sp. nov.
17. Front opaque, larger ..... **divaricata,** var. **perplexa,** var. nov.
    Front shining, smaller, 1.4-1.8 mm ..... **divaricata** Ald.

Phora pachyneura Loew. (Figs. 1 and 2.)

Loew, Centuries, vii, 97 (1866).

Female. Length 2.6-4.2 mm., of wing 3-4 mm. Moderately stout, black, the abdomen opaque, thorax and front subopaque, face shining. Head small, black; antennæ, and palpi of the same color; proboscis exserted, very stout and horny; front broad, short, rather convex, the setæ all turned upward. Scutellum with four marginal bristles. Feet piceous black, knees yellow, hind femora rather broad; middle tibiæ above near the base with two small setæ, front tibiæ with one very minute one, and hind tibiæ unarmed. Halteres black. Wings cinereous, the costa with very short cilia; heavy veins brownish black, the third very stout, furcate; the light veins brownish, toward the apex paler and thinner, the first bent near its base, the fourth subobsolete and greatly abbreviated.

The male differs in having the palpi larger, very shining and with very weak bristles. The antennæ are much larger than in the female and velvety black.

Alaska; Moscow, Idaho; March 17; Wisconsin (Wheeler); Olympia, Wash. (Kincaid); Seattle Wash. (Johnson); Montreal, Que. (Johnson).

This large and stout species can always be recognized by the extremely thickened third longitudinal vein, which is thicker than the costa at its center.

Phora fratercula sp. nov. (Fig. 3.)

Male. Length 2 mm. Head, thorax and abdomen black. Dorsum of thorax somewhat shining, sparsely covered with fine black hairs arranged in longitudinal rows. One pair of dorsocentral macrochætæ and two marginal scutellar bristles. Front short, one and three-fourths times as wide as long, with the usual bristles. Antennæ black, of rather large size, strongly black pubescent; arista pubescent and much thickened at the base. Palpi small, black, the usual lateral bristles present, well developed. Abdomen dull black, grayish pollinose. Hypopygium of rounded form, black and slightly pollinose. Legs long and rather slender, piceous; a little lighter on the anterior coxæ and at the knees. Anterior tibiæ with a delicate external bristle at basal third; middle legs with a pair and hind legs with a single bristle at the basal third, stronger than the ones on the anterior legs. Middle tibiæ with one and posterior tibiæ with two apical spurs. Halteres varying from light brownish to black. Wings very slightly infuscated, the costal vein with short, rather closely placed bristles; reaching to the middle of the wing. First vein ending midway between humeral vein and tip of costa; fourth vein arising at the furcation of the third, ending just before the wing tip, not recurved at the tip; fifth vein ending much behind wing tip; seventh vein wanting, so that there are only three light veins in the wing.

Described from two male specimens, collected by Dr. Wm. M. Wheeler, at Jackson's Lake, Wyoming, September 16, 1895.

This pretty species is related to the European *P. trinervis* Beck.,

but differs by the normal form of the palpi, which do not lack the lateral bristles. It also differs in having a shorter front and shorter first longitudinal vein. From *P. pachyneura* Lw. it is distinguished by its less thickened third vein, longer costal bristles, bristles on hind tibiæ, and presence of only two scutellar bristles.

Phora thoracica Meig. (Fig. 4.)

Meigen, Classification, i, 313.
Zetterstedt, Ins. Lapp., 795, 2.
Zetterstedt, Dipt. Scand., vii, 2852.
Schiner, Fauna Austriaca, ii, 342.
Becker, Monog. Phoridæ, 20.

Thorax and pleuræ reddish yellow, ferruginous or darker. Abdomen black. Halteres yellowish white. Dorsum with only one pair of dorsocentral macrochætæ and four distinct scutellar bristles. Head black, palpi yellow. Antennæ reddish yellow or ferruginous, rather small, arista almost bare; cheeks with two stout, downwardly directed macrochætæ. Second and sixth segments of abdomen elongated. Legs yellow, hind femora broadened; fore tibiæ with a single external bristle near the middle; middle ones with a pair at the base and a third one near the apex; hind tibiæ with two at the basal third, another at the apical third, and a fourth just before the apex; spurs of four posterior tibiæ well developed. Wings large, usually infuscated on the apical third; costal vein reaching beyond the middle of the wing, conspicuously thickened near the middle portion, and ciliate with very fine, short bristles. Third longitudinal vein distinctly bristly as far as the origin of the second; first vein equidistant from the humeral cross-vein and the apex of the costa; fourth vein arising somewhat before the fork of the third, strongly bent at the base, straight elsewhere; seventh vein distinct.

Length 3.5-5 mm., wing 4-5.5 mm.

There is a single specimen of this species, from New Hampshire, in the Osten Sacken Collection at the Museum of Comparative Zoology in Cambridge. I have seen no European specimens, but this one agrees perfectly with Becker's description, of which I have given a translation above. A second specimen is before me from Franconia, N. H. (Mrs. Slosson).

Phora microcephala Lw.

Loew, Centuries, vii, 96.
Aldrich, Canadian Entomologist, xxiv.
Coquillet, *ibid.*, xxvii.

Almost wholly black, antennæ and palpi sometimes brownish; trochanters, knees, tarsi, and fore tibiæ yellowish. Front and thoracic dorsum shining; halteres yellow. Above the base of the fore coxæ are two bristles pointing downward; lower frontal bristles broadly divaricate. No lines or sutures about the ocelli. Wings almost hyaline; third vein extending to the middle or slightly beyond, distinctly forked; first longitudinal extending half-way to the tip of the

third, and the costa enlarged from there to the tip of the third vein. Fourth and fifth veins nearly straight at first, then broadly diverging, then coming together a little, ending equidistant from the apex of the wing; seventh vein indistinct. Middle tibiæ above near base with two setæ, the others with one very small one, which is sometimes imperceptible in the hind tibiæ. Dorsum of thorax with one pair of dorsocentral and four marginal scutellar bristles.

Length 2 mm., of wing 2.2 mm.

The specimens described by Loew were from the district of Columbia. I have seen only the type specimen which is in the Loew collection at Cambridge. The species can easily be recognized from the description.

The specimen referred to by Loew as "var. (?) *vena simplici*" is evidently abnormal, for in every other respect it resembles the type of *microcephala* exactly. It cannot be a species of *Hypocera*, although the simple vein would place it there. It lacks the stout legs and peculiar habitus of the members of that genus. This is the only case out of many hundred specimens which I have examined in which there is any such irregularity in the venation.

Phora spinipes Coq. (Figs. 5 and 6.)

Coquillett, Canadian Entomologist, xxvii. 105.

Black, subshining; the palpi, halteres, front and middle tibiæ with a large portion of their femora, also the knees of the hind legs, yellowish; all frontal setæ pointing upward. Front tibiæ each bearing three setæ on the outer side of the basal three-fourths; middle tibiæ each bearing three setæ in a curved row on the outer side of the basal half; hind tibiæ each with seven setæ in an irregular row extending nearly the entire length of the outer side. Wings hyaline, costal vein extending three-fourths the length of the wing, ciliate with rather short bristles; second heavy vein forked near its apex, tip of first heavy vein slightly beyond the middle between the humeral cross-vein and the apex of the second vein; fourth vein curved near its base, then nearly straight, the cell in front of it scarcely wider than the narrowest part of the cell behind it, seventh vein distinct.

Length 4 mm.

Hartford, Conn. The original type is a specimen taken by Mr. S. N. Dunning on April 30, 1893.

Besides the points noted in the original description, it may be noted that there is a single pair of dorsocentral macrochætæ and four marginal scutellar ones; the wing veins are light brown; the costal cilia extremely short and delicate, and the third vein is finely bristly.

Singularly enough this is the commonest species at Moscow, Idaho. I have from this place forty-six specimens, and Professor Aldrich

writes that he could have obtained any number. The length varies from 2.2–6 mm., of wing the same. On the fore leg I can see only two setæ in any case examined; on the hind leg they sometimes run as high as ten. The palpi being so much lighter than the antennæ is a noticeable character; the latter are black, the former yellow or brownish. Above the fore coxæ is a considerable group of setæ extending upward so as to coalesce with the infra-humeral group. Specimens from Idaho were taken in March, April and May. There is also a single female from Pullman, Wash., collected by Mr. C. V. Piper.

At first sight it would seem that this species is very close to the European *P. spinosissima* Strobl, to which it will go in Becker's table, but it differs decidedly in wing neuration and tibial cheatotaxy.

Phora olympiæ sp. nov. (Fig. 7.)

Female. Reddish yellow; the front, pleuræ, metanotum and first three abdominal segments black.

"Front broad, black, whitish pollinose and not shining, the lower edge in the projecting center red; lowest frontal bristles reclinate, moderately divergent. Antennæ red, with long, bare, slender, brown arista, which is yellowish at the base. Palpi with strong setæ, it and the proboscis yellow Close to the eye, below the antennæ on each side, a group of three setæ. Dorsum of thorax reddish chestnut, hardly at all shining, with one pair of dorsocentral and four marginal scutellar bristles; pleuræ black, indefinitely reddish along the sutures; halteres wholly yellow. The abdomen presents a very decided contrast in color, as indicated above; the venter is darker on the apical part than the dorsum. Legs, including coxæ, yellow; tips of tarsi scarcely darker; fore tibiæ with one, hind tibiæ with two serial setæ about the middle, intermediate tibiæ with two paired setæ near the base; hind femora moderately compressed. Wings large and long, venation exactly as in *P. spinipes* Coq." (J. M. A. MS.)

Length 5 mm, of wing 6 mm.

One female from Olympia, Washington, from Mr. Trevor Kincaid. This is a very distinct and readily recognized species.

Phora scutellata sp. nov. (Figs. 8 and 11.)

Female. Length 3.75 mm. Shining black. Head black, delicately punctured and very shining; front evenly convex, its bristles very stout but not unusually long, all reclinate. Ocelli placed on a slight tubercle. Antennæ fuscous, not prominent, palpi rufous, with moderately long bristles. Thorax above piceous black, subshining, covered with fine, brown, recumbent hairs. One pair of dorsocentral macrochætæ and four marginal scutellar bristles. Scutellum broadly margined with white behind, the margin extending forward in the middle so that the black basal part is distinctly bilobed. Abdomen broad, shining black, each segment narrowly margined with yellowish white; venter yellowish, hairy, as is also the tip of the abdomen. Legs yellowish, but much infuscated in places,

especially the posterior pair. Anterior tibiæ fringed externally with fine setulæ and with a single stout seta near the base on the outer side. Middle tibiæ with a pair of setæ at basal third on the posterior side and another lateral one just before the apex which bears a single spur. Hind tibiæ with five long setæ on outer side, a pair of them being placed just below the knee, then follow three more serially arranged; there is also a preapical seta and two spurs. Just before the apex, on the inner face, there is a series of about five comb-like transverse rows of setæ. Posterior femora very broad, shortly ciliated above and below. Wings subhyaline, very dilutely brownish; all of the veins very strong, black. Costa extending beyond the middle of the wing; first vein ending twice as far from the humeral vein as from tip of costa. Second vein ending close to third; costal bristles rather short and densely placed; fourth vein curved at base, straight at apex; fifth vein straight, ending closer to the wing tip than does the fourth; seventh distinct. Halteres pale yellow.

Described from a single female specimen collected on the island of Grenada, West Indies, by H. H. Smith (No. 172).

This large and handsome species could not be confounded with any other American species.

Phora multiseriata sp. nov. (Figs. 9 and 10.)

"Yellow, the greater part of the abdomen black, tibiæ and tarsi except the front ones blackish. Head, including occiput, wholly purely yellow. One large bristle at lower edge of eye, one descending bristle above the fore coxæ, and two ascending ones below the humerus. Metanotum blackish. Mesonotum with one pair of dorsocentral macrochætæ and only two marginal scutellar bristles. First segment of abdomen yellow, the sides a little darker; the following segments black, with a light yellow posterior margin; venter black. All the coxæ and femora yellow, hind femora greatly flattened and enlarged, the middle ones slightly so; hind tibiæ with an area extending the whole length of the upper side, where the usual minute hairs are replaced by larger ones, arranged in regular transverse rows; about sixteen series of these in the length of the tibia. The middle tibia has a smaller development of the same structure. Fore and hind tibiæ each with one seta below the knee, middle tibiæ with two and before the tip with a third placed at the end of the transverse rows, of which there are about eight. Wings with a yellowish tinge; costal vein scarcely reaching to the middle of the wing, first vein ending two-thirds the distance from the humeral vein to the tip of the third; fork of third vein slender, not diverging much from the main part, both together forming a curve, the convexity of which lies toward the apex and rear. Fourth vein straight, ending considerably before the apex of the wing. Costal vein with small cilia. Hypopygium of male rather small, yellow. Halteres yellow." (J. M. A. MS.)

Length 3.4-4 mm., of wing 3.1-3.5 mm.

Described from one male and five female specimens collected at Lawrence, Kans. I have also seen a specimen from Ithaca, N. Y., in Mr. C. W. Johnson's collection.

This is a rather robust species, especially in the female sex. The

comb like armature of the hind tibiæ is developed to a remarkable extent, much more so than in any other species of *Phoridæ* which I have examined.

Phora venusta Coq.

Coquillett, Canadian Entomologist, xxvii, p. 107 (1895).

♀. Head and thorax black, subshining; antennæ yellowish brown; palpi, halteres and legs, including the coxæ, yellow. Abdomen opaque velvet-black, the broad bases of the second and sixth segments and a triangular dorsal spot at the base of the third, fourth and fifth segments yellow; venter also yellow. Frontal setæ pointing upward. Front tibiæ on the outer side each bearing one, the middle tibiæ with two stout setæ near the base, hind tibiæ destitute of setæ on the outer side. Wings hyaline, costal vein extending to the middle of the wing, ciliate with minute bristles, the second heavy vein forked near the apex, the tip of the first vein near the last fourth of the distance between the humeral cross-vein and tip of the first branch of the second vein; first slender vein nearly straight, the cell in front of it subequal in width to the one behind it.

Length 1 mm.

Type locality, Boston, Mass. One specimen in the U. S. N. M. I have seen no specimens of this species.

Phora comstocki sp. nov. (Fig. 12.)

"*Male.* Antennæ and palpi red, halteres and legs yellow, hind tibiæ and tarsi a little darker; head, thorax and abdomen black. Front opaque. Dorsum of thorax somewhat shining, with two pairs of dorsocentral macrochætæ, of which the anterior pair is the smaller; scutellum with four stout marginal bristles. Pleuræ and middle coxæ brownish. Hind femora thickened; each hind tibia with three strong setæ before the middle and one at apex, besides two strong apical spurs. Middle tibiæ with two strong setæ below the knee and also a subapical one on the front side, besides the spur at apex. Front tibia with a moderately strong seta in the middle of the upper side. Hypopygium in the form of a rather large knob. Wings yellowish; costal vein extending beyond the middle of the wing; first vein reaching three-fifths of the distance from the humeral to the tip of the costal; third vein bare above, except for a single bristle near its base; fourth vein ending just before the apex of the wing, curved at base, straight at apex; fifth vein straight, parallel with the apical part of the fourth." (J. M. A. MS.)

Length 2 mm., of wing 2.5 mm.

One male, Ithaca, N. Y., July 13, 1894 (Cornell Univ.).

Named in honor of Professor J. H. Comstock.

This species differs from *luggeri* in not having hair on the upper side of the third vein, as well as by the number of dorsocentral macrochætæ. In this species the fourth vein in its first part is much less sinuous, there is a row of little bristles below at the tip of the hind femur, and the third seta of the hind and middle tibiæ is not so near the apex.

Phora inggeri Aldrich. (Fig, 13.)

Aldrich, Canadian Entomologist, xxiv, 145.

Head brownish black, front very broad, at the lower border with two small, widely divergent bristles arising a little below the lower edge of the front. Antennæ and palpi brownish yellow, the former with a yellow arista, the latter with stiff black bristles. Thorax brownish black, with few and small bristles; dorsum with a single pair of dorsocentral bristles and four marginal scutellar ones. Abdomen more or less yellowish at base above, the remainder brownish black. Wings hyaline, the heavy veins yellow; third vein hairy on the upper side to the point of furcation which is near the end, the two branches forming a very sharp angle; costal vein reaching considerably beyond the middle of the wing, its bristles short and fine; first vein ending a little nearer to the tip of costa than to the humeral cross-vein. Fourth vein strongly bowed at base, straight for the remaining two-thirds of its course, ending at the apex of the wing. Halteres wholly yellow. Legs entirely yellow, the front tibiæ with a bristle on the outer side below the knee, the middle and hind tibiæ each with a pair in the same position; middle ones with a subapical single bristle and one spur; hind ones with a pair of subapical bristles and a single spur.

Length 2.2-2.6 mm., of wing 2.5-3 mm.

The original types of this species were two females from St. Paul (Lugger).

Besides these, there are some twenty-four specimens in the collection from other parts of the country, as follows: twenty from Lawrence, Kans. (two being from the University of Kansas collection and the others from Aldrich); one from Delaware County, Pa. (Johnson); one from New Bedford, Mass. (Hough).

Phora nitidifrons sp. nov. (Fig. 14.)

Length 1.75-2.25 mm. Black, shining, front legs and antennæ brownish. Head black; front short, a little wider than high, very shining and quite smooth except for a few delicate lateral punctures in some females; bristles all present, of medium size. Palpi piceous, antennæ a little lighter, somewhat enlarged in the male; arista bare. Cheeks below with two stout macrochætæ. Dorsum of thorax shining, with one pair of dorsocentral macrochætæ and four scutellar bristles. Abdomen entirely black; a yellow spot sometimes present above at the base. Legs piceous black, front pair, knees and tarsi usually more brownish yellow. Front tibiæ with a single bristle at basal third; middle ones with a pair in the same position; hind femora stout; hind tibiæ grooved above, with three to five (usually four) small setæ arranged serially on the outer side. Tibial spurs weak, especially those of the middle legs. Projecting part of hypopygium rufous Wings subhyaline, costa reaching about to the middle of the wing, its bristles closely placed but very short and delicate; tip of first vein twice as far from the humeral cross-vein as from tip of costa; fourth vein straight at base, recurved at apex; seventh vein distinct. Halteres pale.

This species resembles *P. cimbicis* Ald. very closely, but can always be separated from it by the smooth front and pale halteres.

Described from 23 specimens: 7 from New Bedford, Mass. (Hough); 9 from Ithaca, N. Y. (Comstock); 2 from Chester Co., Pa. (Johnson); 3 from Philadelphia, Pa. (Johnson); 1 from Delaware Co., Pa. (Johnson); 1 from Wood's Hole, Mass. (Brues).

Phora cimbicis Aldrich. (Fig. 15.)

Aldrich, Canadian Entomologist, xxiv, 143 (1892).

Head black, front broad, below with an obtuse prolongation in the middle; no ocellar prominence; at the extreme lower edge of the front, in the middle, are two bristles directed upward and strongly outward. Antennæ brownish black, palpi of the same color, longer than antennæ. Thorax black, pleuræ a little shining; a group of two or three bristles just below the prothoracic spiracle and a pair at the base of the fore coxæ. One pair of dorsocentral and four marginal scutellar bristles. Abdomen wholly satiny black like thoracic dorsum, except the first segment which is whitish above in the middle; the last segment longer than the preceding. Halteres black, the pedicel a little yellowish at base. Fore and hind tibiæ with one, middle tibiæ with two bristles on the outer side a little below the knee; the hind tibiæ have also a scattering row of three smaller ones running to the tip; the tips of the middle and hind tibiæ with long spurs. Legs wholly satiny brownish black, except that the front ones are from the coxæ gradually lighter, ending in brownish-yellow tarsi and that the middle tarsi and sometimes the middle tibiæ are also brownish yellow. Wings subhyaline; the third vein forked, fourth vein nearly straight, ending a little before the apex of the wing.

Length 3 mm., of wing 2 mm.

Three females, Brookings, South Dakota, reared from cocoons of *Cimbex americana* Leach. Emerged May 24, 26, 27. (Condensed and elaborated from the original description.)

There is also a single additional specimen from New Bedford, Mass. (Hough, No. 2841), and one from Toronto, Can.

This species closely resembles *P. nitidifrons*, but can always be readily recognized by its black halteres and by the fact that the front is foveately punctured, while in *nitidifrons* it is finely punctured on the sides and smooth medially.

Phora incisuralis Loew. (Fig. 16.)

Loew, Centuries, vii, 98 (1866).

Aldrich, Canadian Entomologist, xxiv.

Coquillett, *ibid.*, xxvii.

Front dark brown, antennæ red, palpi yellowish red, broad at tip, and with five black setæ; proboscis rather long, yellow. Thorax yellowish brown above and pure yellow on the sides, middle coxæ distinctly blackened, scutellum and metanotum brown, halteres yellow. Abdomen black above, first segment and posterior margins of the following ones yellow; venter yellow except on last segment. Legs yellow, including front and hind coxæ; tips of the broad hind femora slightly brownish. Fore tibiæ on the upper side with a series of four or

five fine setulæ, on the hind tibiæ a similar series slightly longer are present on the outer side; middle tibiæ with two setæ below the knee. Wings hyaline with a yellowish tinge, at the tip slightly infuscated; costal vein reaching a little beyond the middle of the wing; fork of third vein slender, first vein reaching at least three-fourths the distance from the humeral to the tip of the costal; fourth and fifth veins ending equally far from the apex of the wing, the former uniformly curved; seventh vein extremely delicate. Costa with small, fine cilia.

Length 3-3.6 mm., of wing 2.5 mm.

Besides the above, it may be noted that there is only a single pair of dorsocentral bristles and four equally strong marginal scutellar bristles.

One female specimen from Charles Harbor, Fla., collected by Mrs. Slosson and sent by Mr. Johnson; two specimens, Tifton, Ga., October 16 and 17 (Hough); one, Opelousas, La. (Hough). All females.

These are somewhat lighter in color than Loew's type, still one of these has a rather brown thorax. The only material disagreement is in the pleuræ "*nigromaculatæ*" in his description and the middle coxæ (pale yellow in his, very distinctly brown in some of mine). The type measured only 2.6 mm., but most of the species in this family are extremely variable in size.

This species, as well as *divaricata* and its variety *perplexa*, have on the upper side of the hind tibia a fine, close series of appressed, short hairs, forming a black line the length of the tibia, but this is separate from what Loew alludes to as "*in latero externo.*"

Phora divaricata Aldrich.

Aldrich, Trans. London Ent. Soc., 1896, pt. 3, p. 437.

Antennæ, palpi, pleuræ, halteres and legs deep yellow; front dark brown or black, the lower edge yellowish; thorax above varying from yellow to brown. Abdomen black or brown, the posterior margin of each segment with a narrow band of light yellow, which continues more or less as a stripe down the middle of the dorsum; venter yellow. Dorsum of thorax with one pair of dorsocentral macrochætæ and only two strong marginal scutellar bristles. The other pair is present, but very small and scarcely noticeable. Anterior tibiæ on the upper side with a row of four setæ; middle tibiæ with two setæ below the knee, hind tibiæ with a minute row of fine hairs along the upper edge, but no setæ except at apex. Hind femora considerably thickened. Wings tinged with yellow; costal vein reaching a little past the middle of the wing; first vein reaching three-fourths of the way from humeral to tip of costal; the fork of the third vein but little visible, close to the main part; male hypopygium very large and conspicuous, bent under.

Length 1.4-1.8 mm., of wing 1.5-2.4 mm.

Before me are the types, two males and five females from St. Vin-

cent, West Indies, also six males and one female from Grenada, W. I. All were collected by H. H. Smith and sent by Dr. Williston, who received them from the Entomological Society of London.

The relationship of this species to *incisuralis* Lw. is such that the variety *perplexa* forms a connecting link between them. Typical *divaricata* is more yellow and smaller than *perplexa* and has a more tropical range.

P. divaricata Ald., var. **perplexa,** var. nov.
Coquillett (*P. incisuralis*), Canadian Entomologist, xxvii, 104.

Precisely like the foregoing, but differing by its larger size and more northern range. It is very closely related to both *incisuralis* Lw. and *divaricata* Ald., but can be readily distinguished from the former by the absence of the four or five small setæ on the hind tibiæ, which characterize *incisuralis*. It also agrees more closely with *divaricata* on account of the extremely small size of the lateral scutellar bristles, which are large and stout in *incisuralis*. It would seem to be an incipient species. This is evidently the form tabulated by Coquillet (*loc. cit.*) as typical *incisuralis*.

Three specimens: one from Tick Island, Fla. (Johnson), May 3, 1894, and two from Tifton, Ga., October 16 and 17, 1896 (Hough).

Phora groenlandica Lundbeck. (Fig. 17.)
Saertryk af Vidensk. Medd. fra den naturh. Foren. i Kjbh. (1900.)

Black, slightly cinerascent, thorax somewhat shining, abdomen opaque. Head, antennæ and palpi, black. Wings hyaline, slightly yellowish, costa provided with rather long bristles, nervures dark; third longitudinal vein furcate, the four longitudinal nervures more slender than the first and third veins. Halteres black, legs piceous, everywhere covered with short hairs; posterior tibiæ with rather long spurs. Male and female, length 2-2.3 mm.

Related to *Phora ciliata*, but readily distinguished by the black palpi, longer costal bristles and different wing venation.

Male. Black, slightly cinerascent, thorax somewhat shining, densely covered with short, delicate, brown pile; with long macrochætæ along the margin. Abdomen opaque. Head equal to thorax in width, front wide, black, provided with long reflexed macrochætæ and with a median impressed line. Palpi black, sometimes brownish; antennæ black. Wings hyaline, slightly yellowish, costa provided with rather long bristles, nervures dark brown, first longitudinal vein ending before the third, third furcate at the apex. Four delicate longitudinal nervures are present, the first of which is rather curved at the base and straight apically, ending before the apex of the wing, second and third of these four nervures slightly sinuate, especially the third, fourth almost straight. Near the front margin of the wing, extending from the third longitudinal vein, is an obsolete fold which simulates a nervure. Halteres black; legs piceous varying to

brown, anterior ones lighter, all delicately pilose, tibiæ, especially on the exterior margin, densely short ciliate, posterior tibial spur long.

Female. Resembles the male, but the abdomen is shorter and stouter.

Habitat, Greenland, west coast, as far north as Lat. 69°.

I have not seen this species, but have inserted it in the table from the description, which unfortunately omits the important details of the chætotaxy of the thorax and legs.

DORNIPHORA Dahl.

Dahl, SB. d. naturf. Freunde. 1898, No. 10, p. 188.
Becker, Monog. Phoridæ, p. 84. (1901.)

Front with three transverse rows of four bristles each and two anterior reclinate bristles. Ocelli present, third joint of antennæ with a dorsal arista, third vein forked, mediastinal vein obsolete, costa very finely ciliated. Legs bristly, pulvilli and empodium wanting or much reduced. Front tibiæ with a row of four bristles on the anterior side; middle tibiæ with a pair of bristles near the base and a third just before the apex, besides the tibial spurs. Hind tibiæ somewhat widened, ciliated with fine bristles. Proboscis of the female thin and greatly elongated, normal in the male.

Represented by a single species from the Bismarck Archipelago, *D. dohrni* Dahl.

The close resemblance which this species shows to the American *P. incisuralis* Lw. and *P. divaricata* and the chætotaxy of the front legs is very striking, the present genus being separable from these two *Phoras* only by the weakened mediastinal vein, differently shaped anal angle of the wing and long proboscis of the female. I doubt, therefore, if it really represents a valid genus. Dahl has mentioned the relation between *Dorniphora* and *Phora incisuralis*, and suggested that possibly the latter has an elongated proboscis in the female. The proboscis in this sex is, however, perfectly normal.

HYPOCERA Lioy.

Lioy, Atti. Inst. Venet., 1864, 78.
Lioy (*Gymnoptera*), l. c., 79.
Becker, 1901, Monog. Phoridæ (Phora).

Anterior frontal bristles reclinate; frontal bristles twelve or fourteen in number, arranged as in *Phora*. When there are only twelve, either the two anterior ones or the middle two of the next row above may be wanting. Third longitudinal vein simple, not furcate, often separated or imperfectly fused with the costal vein at the tip. Antennæ variable, usually ovate or oval, with a dorsal arista, but sometimes they are elongated and drawn out into a point, and bear a sub-apical arista. Front sometimes with an ocellar tubercle or with a median groove. Costal vein ciliated with bristles; mediastinal vein distinct, seventh

vein present; anal angle of the wing with a series of bristles. Ovipositor of female retractile, not heavily chitinized or spear-shaped. Legs usually with bristles on the outer side of all the tibiæ before the apex, generally one on the fore tibia, two on the middle, and one, two or none on the hind tibia. Pulvilli and empodia distinct.

All the species which I have included in the present genus are considered by Becker as belonging to *Phora*, but all are very distinct by the characters enumerated above. The species also differ in habitus, being of more robust form and with stouter hind legs.

I have adopted the name *Hypocera*, although when described by Lioy it was improperly characterized. His various types, however, seem all to belong here, so I have modified the diagnosis as shown above.

TABLE OF NORTH AMERICAN SPECIES.

1. Antennæ with the third joint oval as usual, last joint of front tarsi not enlarged.....2.
   Third antennal joint long and pointed, last joint of front tarsi flattened and enlarged, vertex semicircularly elevated in the male. 1. **johnsoni** sp. nov.
2. Fourth vein evenly curved throughout, gradually and evenly divergent from the fifth, small species.....6. **grenadensis** sp. nov.
   Fourth vein more strongly flexed at the base than at the apex, halteres black.....3.
3. Hind tibiæ with a bristle on outer side just before the middle.....4.
   Hind tibiæ without a bristle externally, but on whole outer side covered with transverse rows of flat black hairs.....2. **ehrmanni** sp. nov.
4. Antennæ, palpi and proboscis black, third longitudinal vein finely hairy for its entire length.....3. **femorata** Meig.
   Palpi and proboscis yellow.....5.
5. Wings hyaline, the third vein clavate at its tip, antennæ reddish yellow. 4. **clavata** Lw.
   Wings strongly infuscated, third vein scarcely enlarged at apex, antennæ reddish brown or piceous.....5. **mordellaria** Fall.

Hypocera johnsoni sp. nov. (Plate vi, figs. 18, 19.)

Male. Black, except antennæ and palpi, which are orange yellow, and front legs, which are brownish. Head black, front shining, evenly and rather sparsely coarsely punctate throughout. Two anterior frontal bristles stout, reclinate, next row above consisting only of the two lateral bristles, the median ones being absent; next row of four bristles arranged in a straight line; vertex as in the male of *coronata* Becker,—*i. e.*, semicircularly elevated and very sharp above; ocellar tubercle present, although not elevated so far as in *coronata*. Antennæ long, oval and acuminate toward the tips, equal in length to the eye height and arcuate, bright orange yellow, glistening in certain lights. Arista apical or very nearly so, no longer than the third joint, whitish pubescent. Palpi small, flattened, strongly setose. Cheeks with a single bristle; infraocular cilia long, but

shorter than in *ehrmanni*. Dorsum scarcely shining, with one pair of dorsocentral, two large and two smaller scutellar macrochætæ. Halteres black, white pollinose. Anterior legs black at base and varying through brown to luteous on the tarsi, the last joint of which is enlarged and flattened as in the European *coronata;* the tibiæ with a single external bristle just before the middle. Middle and hind legs with the trochanters and knees yellowish; middle tibiæ with a pair of setæ just before the middle and a third just before apex on outer side, as well as a single long apical spur. Hind tibiæ with two grooves above, inclosing a longitudinal carina; with one bristle just before the middle and another just before the apex which bears two long and several short spines; there are also about three comb-like rows on the *inner* side at apex. Abdomen shining, second segment very much elongated; hypopygium large, ventral, shining. Wings hyaline, yellowish between the thick basal nervures, which are ferruginous. Cilia of costa dense, but not long; first vein meeting the costa a little more than half way from the humeral vein to tip of third longitudinal; the latter straight, with a small knob at apex; costal vein reaching to about the middle of the wing; fourth vein curved at the base, straight elsewhere; fifth vein straight throughout; seventh not very distinct; apex of wing much nearer to tip of fourth vein than fifth; fourth vein far away from third at its point of origin.

Length 5 mm.

Described from a single male specimen, collected at Riverton, N. J., August 31, by Mr. C. W. Johnson, after whom I take great pleasure in naming this interesting species.

The present species is evidently closely related to *coronata* Becker, of Europe (Becker, Monog. Phor., 41), but differs very clearly in the frontal cheatotaxy, form and color of antennæ and palpi, and wing venation.

The antennæ of this species recall strikingly those of *Conicera*, yet the insect does not have the habitus or other characters of that genus. It would seem that the form of the antennæ alone cannot be a very valuable character for the definition of genera.

This may possibly prove to be the male of *ehrmanni*, but the differences between the two are so much greater than those between the sexes of the closely related *coronata* that I have no doubt they will prove to be quite different species. Unfortunately it is impossible to be absolutely sure.

Hypocera ehrmanni sp. nov. (Plate vi, fig. 20.)

"*Female.* A large and robust species; everywhere shining black except the antennæ and palpi, which are deep yellow, the former reddish, with a long black arista on the oval third joint. Trochanters also somewhat red and the knobs of the halteres more brown than black, the stems yellowish. Front very polished, punctured and hairy on the sides, smooth in the middle. Anterior pair of frontal bristles present, approximate and reclinate; next row above arcuate, the row above less so and placed high up. No ocellar tubercle, but the vertex is sharp,

somewhat as in the female of *coronata* Becker. Postocular cilia very long and stout below, cheeks each with one long bristle. Thorax subshining, with one pair of dorsocentral macrochætæ and four marginal scutellar bristles. Abdomen with considerable hair on the sides, second segment longest. Front tibia with a single strong seta before the middle; anterior tarsi with the last joint not flattened or enlarged; intermediate tibia with two setæ at the basal third, also two long and several short apical spines; hind femora much flattened, their tibiæ with no setæ, but the small appressed hairs are arranged in about twenty-five comb-like transverse rows along the entire length of the hind side, much as in *P. multiseriata*, with two long and several short apical spines. Wings brownish, especially toward the tips, costal vein reaching nearly to the middle of the wing, densely ciliate with rather long hairs; first vein terminating nearly two-thirds the distance from the humeral vein to the tip of costal; fourth vein gently curved at base and slightly recurved at apex; seventh vein distinct." (J. M. A. MS.)

One female, Pittsburg, Pa., from Mr. G. A. Ehrmann, to whose enthusiasm and kindness I owe a number of interesting species of Diptera.

Hypocera femorata Meig. (Plate vi, fig. 21.)

Meigen, Syst. Beschr., vi, 213, 5 (1830).
Zetterstedt, Dipt. Scand., vii, 2886, 34.
Schiner, Fauna Austriaca, ii, p. 339.
Becker, Monog. Phor., p. 41 (1901).

Male. Length 2 5-3 mm. Thorax, abdomen and halteres black. Dorsum of thorax rather shining and bearing only one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Front wide, strongly convex and shining; the middle row of bristles forming a straight line very near to the vertex, so that the distance between it and the lower row is greater than usual; the lower row is arcuate and the two middle bristles above the antennæ are lacking. Antennæ, palpi and proboscis black; third antennal joint small with a bare arista; a long macrochæta placed at the corner of the eye. Abdomen opaque, the second segment elongated and with long hairs on the sides, sixth segment not elongated Hypopygium small, usually only two lamellæ, and no basal cylindrical part visible. Legs piceous, coxæ at tip and knees only a little paler. Fore tibiæ and tarsi reddish-brown, the former with a bristle at the basal third; middle tibiæ with a pair of bristles at the same place and also a bristle on the outer side just before the apex, as well as a long apical spur. Hind tibiæ grooved and thickened, with a bristle on the outer side at the basal third, a second just before the apex, and three to four apical spurs. Wings weakly tinged with yellowish brown, the costal vein reaching to the middle of the wing, not thickened and provided with short bristles; third vein not forked, but usually enlarged and slightly lamellate at apex, finely hairy for its entire length. First and third longitudinal veins widely separated, so that the first segment of the costal vein is only one and one-fourth times as long as the second. Fourth vein very strongly arcuate at its base, straight at apex, approaching near to the fifth at base.

The female differs in having the lamelliform enlargement of the third vein more distinct.

I have three females which I cannot distinguish in any way from the description of European specimens. One was collected by Mr. C. Abbott Davis at Providence, R. I., May 30, and was sent me by Mr. C. W. Johnson; another is from Mt. Washington, N. H. (Mrs. Slosson); and a third from New Bedford, Mass. (Hough).

Hypocera clavata Lw. (Plate vi, figs. 22, 23.)

Loew, Centuries, vii, 95.
Aldrich, Canad. Ent., xxiv.

Male and female. Very black, moderately shining, all the frontal setæ directed upward. Antennæ red, palpi luteous Wings hyaline, costa with very short cilia, second vein simple, middle tibiæ with two setæ above, others with one. Length 2.6-3 mm., of wing the same.

Stout, very black, moderately shining; front broad, rather convex, punctured, all bristles directed upward. Antennæ reddish, with ochraceous tinge; palpi rather broad, luteous; apex of the abdomen, especially in the male, more shining than the rest of the body. Front legs dull testaceous, varied with fuscous; hind legs black or piceous black, knees testaceous; hind femora very black; middle tibiæ above near base with two setæ, the others with one. Halteres black. Wings hyaline, costa black, very finely ciliate. Of the strong veins the second is simple, the apex dilated; of the slender veins the first is extremely flexed near the base.

District of Columbia (Osten Sacken).

This species is allied to *Phora femorata*, but is easily to be distinguished by the color of the antennæ and palpi.

Besides the original type there is in the Museum of Comparative Zoology at Cambridge a specimen from New Hampshire. In the collection before me are two specimens, both collected by Mr. C. W. Johnson, one from Boston, the other from Montgomery County, Pa., July 4, 1892; and a headless ♀ apparently of this species from Douglas County, Kans.

Besides its lighter color, this species differs from *femorata* by the sharper curvature of the fourth vein in the wing.

Hypocera mordellaria Fallen.

Fallen, Dipt. Suec. Phytomyzides, 6, 4 (1823).
Meigen, Syst. Beschr., vi, 212, 2.
Zetterstedt, Dipt. Scand., vii, 2883, 31.
Schiner, Fauna Austr., ii, p. 339.
Coquillett, Canad. Ent., xxvii, p. 104.

Male. Length 3-3.5 mm. Thorax, abdomen and halteres black, dorsum of thorax with one pair of dorsocentral macrochætæ and two marginal scutellar bristles, front shining, with the usual bristles, the middle row of which forms a straight line while the lower row is arcuate. Antennæ varying from reddish brown to piceous, the third joint rather large, with a finely pubescent arista.

Palpi and proboscis reddish yellow, a strong bristle at the lower corner of the eye. Abdomen opaque, the first segment margined with yellow, second segment elongated, its lateral angles with long black hairs; sixth segment not elongated, but usually with a yellow border which is also sometimes visible on the other segments. Hypopygium of moderate size, with long hairs and a distinctly protruding, yellow-black, hairy, sheath-like appendage. Legs piceous, the trochanters and knees, front tibiæ and their tarsi reddish yellow; femora thickened. Fore tibia with a bristle at the basal third; middle ones with a pair at the base and a second outer bristle at the apical third, as well as a long apical spur. Hind tibiæ clavately thickened, but without a groove, with short recumbent ciliation on the posterior face; with an external bristle at the basal third, and another just before the apex, which bears two spurs. Wings strongly tinged with fuliginous brown; costal vein attaining the middle of the wing, rather stout, especially at the base, and piceous; the other veins yellowish brown. Ciliation of costal vein long and sparse, third vein not forked, finely bristly on its basal third; first segment of costal vein not much longer than the second; fourth vein sharply arcuate at base and straight at apex.

The female has a somewhat smaller third antennal joint and the arista is a little more strongly pubescent.

This species was recorded from North America by Coquillett. I have seen no specimens from this country.

Hypocera grenadensis sp. nov. (Plate vi, fig. 24.)

Female. Head black, front shining, two anterior frontal bristles small, reclinate, next row large, arranged in a straight line, as are also the two upper rows. No ocellar tubercle present, but the front bears a deeply impressed median longitudinal line. Antennæ somewhat obtusely pointed, dull ferruginous, darker where the subapical feathered black arista is inserted. Palpi small, bristly, reddish brown. Dorsum rather shining, black, except for slightly yellowish anterior margin and humeral angles. One pair of dorsocentral macrochætæ and two distinct marginal scutellar bristles, besides two very small lateral ones. Halteres reddish yellow. Abdomen yellowish brown except for small subtriangular spots laterally on each segment; apical segment black. Ovipositor long, exserted, but not more heavily chitinized than usual. Legs honey yellow; anterior tibiæ with a bristle on the outer side at basal and apical third; middle tibiæ with a pair of stout bristles on outer side at basal third and another smaller subapical one, besides a very long spur at apex. Posterior tibiæ with a single external bristle at basal third, another subapical one and two apical spurs. Hind tarsi very long, the first joint bristly below. Wings hyaline, the costal vein black, other nervures piceous; costal vein reaching to the middle of the wing, velvety black and considerably thickened throughout; third vein gradually thickened toward tip, not clavate, and free from costa at tip; seventh vein distinct.

Length 1.8 mm., wing 1.7 mm.

Described from a single female specimen collected by H. H. Smith on the Island of Grenada, West Indies, (No. 57.)

This is the smallest species of the genus which I have seen. It is very distinct and not closely related to any described species.

TABLE OF SPECIES.

1. Dorsum of thorax yellow or reddish yellow.....2.
   Dorsum of thorax dark brown or black.....15.
2. Front twice as high as broad, with no median bristles in the two rows next above the proclinate ones, which are small and all of equal size, insect wholly yellow, with black spots on the abdomen....**epeirae** Brues.
   Front of the usual form, and not lacking any of the median bristles.....3.
3. Scutellum with four equally strong marginal bristles.....4.
   Scutellum with only two distinct bristles.....8.
4. Wings more or less yellowish, the veins yellowish brown.....5.
   Wings hyaline, the veins blackish, costal vein not quite reaching to the middle of the wing.....**nigriceps** Lw. var.
5. Head, antennæ and front, except ocellar tubercle, yellow.....6.
   Head, antennæ and front black, second segment of abdomen without, or with scarcely evident lateral hairs, palpi longer and broader than usual. **nigriceps** Lw.
6. Costal vein reaching to or slightly beyond the middle of the wing. **picta** Lehm.
   Costal vein reaching far beyond the middle of the wing, fourth vein evenly curved.....7.
7. Abdomen in great part bright orange yellow, costal vein unusually long, its cilia moderate.....**aurea** Aldrich.
   Abdomen almost entirely black, segments each with very narrow pale border and more or less yellowish median portions, costal vein not so long, its cilia rather short.....**scalaris** Lw.
8. Costal vein reaching to the middle of the wing or beyond.....11.
   Costal vein short, not reaching to the middle of the wing.....9.
9. Proclinate bristles small or wanting, hind tarsi black, the hind metatarsus of the female thickened.....**fasciata** Fall.
   Proclinate bristles well developed, hind tarsi yellow, the hind metatarsus not thickened in the female.....10.
10. Halteres brown or black.....**fungicola** Coq.
    Halteres yellow.....**fungicola** Coq. var.
11. Costal vein with very short cilia, tip of first vein as near to humeral vein as to the tip of the third vein.....**flava** Fall.
    Cilia of costa not quite so short, segments of abdomen each with lateral black triangular spots which sometimes fuse into bands. **flava** Fall. var. (?)
    Costal vein with rather long cilia.....12.
12. Frontal cheatotaxy as usual, lower edge of front with four proclinate median and two reclinate lateral bristles on each side.....13.
    Lower edge of front with four proclinate median bristles and only one reclinate one on each side.....**atlantica** sp. nov.
13. Fifth and sixth veins convergent for basal half, then strongly divergent, seventh vein very close to the wing margin, wings brown..**obscura.**
    Fifth and sixth veins gradually divergent for their whole length, wings hyaline.....14
14. Tip of first vein one and one-half times as far from the humeral vein as from the tip of the third vein.....**lutea** Meig.

15. Scutellum with four equally strong bristles.....16.
Scutellum with only two bristles.....18.
16. Palpi of male enlarged and without the usual bristles, fifth vein sinuate at the middle and then parallel with the fourth..**magnipalpis** Ald.
Not such species.....17.
17. Tip of first vein twice as far from the humeral cross-vein as from the tip of the third.....**girandii** Egg.
Tip of first vein one and one-half times as far from the humeral cross-vein as from the tip of the third.....**halictorum** M. et B.
18. Abdomen of male with long, erect, blunt hairs, especially thickly placed near the tip, costal vein reaching about to the middle of the wing, with very long cilia, black, except palpi and legs....**rufipes** Meig.
Abdomen destitute of such hairs, bare, or nearly so.....19.
19. Proboscis of female normal.....21.
Proboscis of female exserted and enlarged.....20.
20. Proboscis much swollen and enlarged, very fleshy, palpi black, shining black species with light yellow legs.....**rostrata** M. et B.
Proboscis projecting, stout and horny, third antennal joint of male enlarged. **cata** M. et B.
21. Posterior tibiæ strongly ciliated above with bristles.....23.
Posterior tibiæ not, or very obsoletely ciliated above.....22.
22. Costal vein extremely short, reaching only one-third of the length of the wing; first, second and third veins ending very close together. **pygmæa** Zett.
Costal vein longer, distinctly more than one-third the length of the wing..24.
23. Wings infuscated.....**minuta** Ald.
Wings hyaline.....**furtiva** Ald.
24. Costal vein with long cilia.....25.
Costal vein with short, thickly placed cilia, reaching to the middle of the wing.....**nigriceps** Lw.
25. Costal vein reaching to the middle of the wing, legs yellowish or piceous. **pulicaria** Fall.
Costal vein not reaching to the middle of the wing.....26.
26. Tip of first vein midway between humeral cross-vein and tip of third. **setacea** Ald
Tip of first vein much nearer to tip of third vein than to the humeral cross-vein.....27.
27. Thorax shining, four distinct proclinate bristles.....**agarici** Lint.
Thorax dull, only two distinct proclinate bristles, the other pair very small. **albidohalteris** Felt.

Aphiochæta epeiræ Brues. (Plate iv, fig. 25.)

1902. Brues, Psyche, p. 351. Fig.

Female. Length 3-3.5 mm. Rather broad and stout, almost wholly yellow. Abdomen quadrimaculate with black. Front shining, delicately punctulate and with a few black hairs; twice as high as broad; with a lateral row of four bristles, the vertex with four bristles arranged at the corners of a square between the lateral rows; four anterior proclinate bristles also present. Ocellar tubercle absent, no median furrow on the front. Antennæ luteous, except the third seg-

ment of the arista, which is black. Palpi yellow. Post-ocular cilia stout, black, the lowest three or four, which are below the eye, being stout and twice as long as the others. Thorax yellow, paler below and brownish above except for a rather wide dorsal vitta. Dorsum subshining, with a single pair of dorsocentral macrochætæ and two marginal scutellar bristles. Abdomen yellow, first two segments each with a large, quadrate, very sharply defined, lateral spot (sometimes absent on the third segment). The spots on the second segment each bear a tuft of small black bristles at the middle. Ovipositor black at extreme base. Legs yellow, each coxa with a few stout bristles at the apex, together forming a stiff backwardly directed brush. Femora wholly pale, the posterior ones deeper yellow. Tibiæ, especially the posterior pair, spinulose above; four posterior tibiæ each with a single apical spur, that of the middle leg very long, half as long as the tibia. The posterior tibiæ have a fine black line above, and their tarsi are bilineate with black externally. Wings yellowish, faintly dusky at the tips, veins fuscous; costal vein thickened medially, reaching to the middle of the wing, its cilia of medium length; third vein furcate; tip of first vein midway between the humeral vein and tip of third vein. Four equally distinct lighter veins present,

Besides the original types from Texas, I have a specimen from Opelousas, La. (Hough); one from Florida; two from Delaware Water Gap (Johnson); and one from North Mt., Pa. (Johnson).

This is a very distinct species by the form of the front and frontal cheatotaxy. The abdominal coloration is also very characteristic, and seems to be quite constant. The species has been bred from the egg cocoons of the spider *Epeira*.

Aphiochæta pygmæa Zett. (Plate iv, fig. 26.)

Zetterstedt, Dipt. Scand., vii, 2860.
Egger, Verhd d. k.k. zool.-bot. Ges., 1236 (1862) (*brachyneura*).
Schiner, Fauna Austriaca, ii, 344 (*brachyneura*).
Strobl, Phoriden Oesterreichs, 196, 11 (*brachyneura*).
Becker, Monog. Phoridæ, p. 49.

Male. Thorax and abdomen black, brown, reddish or yellow. Dorsum of thorax with short, fine, black hairs and two scutellar bristles. Halteres yellow. Head yellow or dark brown; the front opaque, gray pollinose. Antennæ varying from yellow to brown, the third joint of only medium size, with an almost bare arista. Palpi pale, with the usual bristles. In the lighter specimens the abdomen is considerably darkened above or has wide blackish bands anteriorly on the segments. Legs yellow, varying to blackish brown, the tips of the hind femora blackened. Hind tibiæ lined with black and very finely ciliate. Wings and veins weakly yellowish brown. Costal vein with rather long cilia, reaching to only one-third the length of the wing; the first vein ending very close to the second, so that the first segment of the costal vein is three or four times as long as the second.

There are three specimens from Moscow, Idaho (Aldrich); one from Palo Alto, Cal. (Stanford University); and a number from

Austin, Texas (Melander), which undoubtedly belong to this species. They differ as follows from the above description of European specimens as given by Becker: the body is uniformly darker, almost black, the halteres blackish, wing veins darker, hind femora unicolorous, dark brown in Idaho specimens. Otherwise they seem to be identical with the European form.

Aphiochæta fasciata Fallen.

Fallen, Dipt. Suec. Phytomyzides, 7, 9.
Zetterstedt, Dipt. Scand., vii, 2879, 28.
Schiner, Fauna Austriaca, ii, 344.
Slosson, Entomological News, vi, 7.
Aldrich, Diptera of St. Vinc., Trans. Lond. Ent. Soc., 1896.
Becker, Monog. Phoridæ, p. 50.

Length 1.75–2 mm. Wholly yellow; second to fourth abdominal segments black above. Two scutellar and one pair of dorsocentral bristles present. Head yellow; front above varying from gray to fuscous; strongly convex and long, so that the antennæ are inserted very low down; second joint large, ovate, with a short bare arista. Lower row of frontal macrochætæ arranged in an arcuate row, widely separated from the second row; the middle pair of anteriorly directed bristles absent or scarcely developed. Abdomen and halteres dull yellow; abdomen more or less infuscated, but the fifth segment usually bright yellow. Hind tibiæ not darkened at the apex, lined with black and with two evident rows of fine bristles; hind tarsi black. Wings rather small, almost hyaline; the costal vein short and weakly bristly, not reaching to the middle of the wing. First and second longitudinal veins closely approximated.

I have not seen any specimens from this side of the Atlantic. It has been reported from New Hampshire by Mrs. Slosson, and from St. Vincent by Professor Aldrich.

It should be easily recognized by the short costal vein, which falls considerably short of the middle of the wing. This is also the case in *pygmæa* Zett., but in this latter species it is still shorter and is only one-third the length of the wing.

Aphiochæta obscura sp. nov. (Plate vi, fig. 27.)

Length 1 mm. Head brown, thorax and legs yellowish, abdomen black, wings brown. Front fuscous, sparsely pale hairy, cheatotaxy as usual. Ocellar tubercle and median impressed line very prominent. Antennæ small, yellowish brown, with a pubescent arista. Palpi yellow, with strong bristles; post-ocular cilia much enlarged below; two strong cheek bristles. Thoracic dorsum luteous, rather shining; with one pair of dorsocentral macrochætæ and only two marginal scutellar bristles. Halteres pale brown. Abdomen black, the posterior edges of the segments brownish, last segment yellow. Legs luteous, darker toward the tarsi; middle and hind tibiæ each with a single apical spur; the hind ones very obsoletely ciliated. Wings infuscated; brownish yellow; veins piceous; costa reaching to the middle of the wing, its bristles sparse and delicate, although not

so very short; first vein ending midway between the humeral cross-vein and the tip of the costa; fourth vein evenly curved, fifth and sixth convergent to the middle, then sharply divergent; seventh vein very close to the anal margin of the wing.

Described from a single female specimen from St. Vincent, West Indies (No. 17).

This species is most easily recognized by its brown wings and the configuration of the light veins.

Aphiochæta picta Lehman. (Plate vii, fig. 28.)

Lehmann, Hamb. Observ., 1822, p. 43.
Zetterstedt, Ins. Lapp., 797, 12 (*interrupta*).
Macquart, S. à Buffon., ii, 628, 17 (*interrupta*).
Schiner, Fauna Austriaca, ii, 337 (*interrupta*).
Coquillett, Canad. Entomol., xxvii, 104 (*interrupta*).
Becker, Monogr. Phoridæ, p. 52.

Male. Length 2.5 mm. Wholly yellow; thoracic dorsum somewhat shining, with four distinct scutellar macrochætæ and one pair of dorsocentrals. Head usually entirely yellow, including the front and greater part of the cheeks, although the former is sometimes gray pollinose; frontal bristles all present and in the usual positions; second antennal joint rather large, with a somewhat pubescent arista; cheeks with a row of bristles in addition to the usual two stout macrochætæ; palpi feebly or not at all bristly. Pleuræ below the roots of the wing and posterior face of middle coxæ with small black dots. Halteres and legs yellow, the tips of posterior femora infuscated. Hind tibiæ lined with black and distinctly ciliated, under side of hind femora with black bristly hairs. Wings tinged with yellowish brown; the costal vein with short bristles, reaching to the middle of the wing; veins yellowish brown.

The female differs by the normally bristly palpi, the smaller third antennal joint, the presence of only very short bristly hairs on the hind femora.

This common European species is represented in the collection by specimens from Wisconsin (Wheeler). It has previously been recorded from North America,—New Jersey (Smith's List); White Mountains, N. H. (Slosson); St. Vincent, W. I. (Aldrich).

Aphiochæta flava Fallen. (Plate vi, fig. 29.)

Trineura flava. Fallen, Dipt. Scand. Phytomyzides, 7, 8.
Phora flava. Zetterstedt, Ins. Lapp., 797, 10.
Phora flava. Zetterstedt, Dipt. Scand., vii, 2876.
Phora flava. Schiner, Fauna Austriaca, ii, 343.
Phora flava. Becker, Monog. Phoridæ, p. 54.

Length 1.5-2 mm. Thorax, abdomen and halteres reddish yellow. Dorsum of thorax opaque, covered with short black pile; only two scutellar and one pair of dorsocentral macrochætæ present. Head grayish yellow, front grayish pollinose. Antennæ and palpi varying from reddish to bright yellow, of the usual

size; arista long, pubescent; cheeks just below the eye with two stout downwardly directed macrochætæ. Abdomen opaque, sometimes brownish or blackish above, but without distinct markings. Legs yellow, the tips of the posterior femora infuscated; posterior tibiæ lined above with black and delicately spinulose. Wings grayish brown; costal vein reaching to the middle of the wing, its bristles very short; first longitudinal vein very short, so that the first segment of the costa is no longer than the second; fourth vein, which arises at the bifurcation of the third, somewhat arcuate and terminating before the apex of the wing.

This common and variable European species is represented in the collection by numerous specimens from Wisconsin (Wheeler) and New Jersey (Johnson). Many of the specimens vary much in color from the type form, but all seem to belong to a single species. Some have the costal bristles a trifle longer, and spotted or banded abdomens, otherwise they are exactly similar.

Aphiochæta atlantica sp. nov. (Plate vii, fig. 30.)

Length 1.75-2.5 mm. Yellow, except tips of hind femora and anterior lateral corners of abdominal segments. Head honey yellow, front thickly covered with fine black hairs. Ocellar tubercle and median furrow present; frontal chætotaxy normal, except that the four proclinate bristles are of nearly equal size and placed in a curve, besides these there is only a single reclinate bristle in the lower row, quite close to the eye. At the lower margin of the eye is a row of stout, downwardly directed bristles. Palpi very small. Antennæ yellow, with a pubescent arista. Thorax somewhat shining, black pubescent, with two scutellar bristles and a single pair of dorsocentrals. Abdomen yellow, the second to fifth segments with a small black spot at the side anteriorly; tip of abdomen black. Second segment with a few weak bristles laterally. Legs yellow, except the tips of the hind femora, which are blackish; posterior tibiæ with a black line above and distinctly ciliated with delicate bristles. Wings yellowish, the veins very strong, fuscous; costa extending to the middle of the wing, with closely placed, very short bristles, first vein ending a little nearer to the tip of the third than to the humeral cross-vein; fourth vein evenly curved.

Described from a number of specimens,—one from Atco, N. J.; one from Natrona, Pa. (Johnson); several from Wood's Hole, Mass. (Melander and Brues).

This species closely resembles *flava* Fallen, but differs by the arrangement of the frontal bristles.

Aphiochæta lutea Meigen. (Plate vii, fig. 31.)

Meigen, Syst. Beschr. vi, 220.
Fallen, Dipt. Suec., Phhytomyzides, 7, 8.
Macquart, S. à Buffon, ii, 628, 18.
Zetterstedt, Ins. Lap., 797, 11.
Zetterstedt, Dipt. Scand., vii, 2877.
Becker, Monog. Phoridæ, p. 54.

Length 2 mm. Wholly yellow; dorsum of thorax very slightly shining, with only two scutellar and one pair of dorsocentral macrochætæ. Front yellow or somewhat gray pollinose. Antennæ bright yellow, as are also the palpi; antennal arista pubescent; two strong macrochætæ just below the eye Abdomen usually dull yellow; dorsum often infuscated or yellow, with lateral black spots on the third and fourth segments. Legs bright yellow, darker on the tips of the femora. Hind tibiæ with a black line above and a row of delicate setulæ. Wings yellowish; veins of the same color. Costal vein reaching to the middle of the wing, its bristles rather long; first and second longitudinal veins slightly more approximated than in *flava* Fall.

There are numerous specimens from Opelousas, La. (Hough), and Wisconsin (Wheeler), which agree well with European specimens of this species. The abdomen varies considerably in color, but otherwise I can detect no differences.

Aphiochæta fungicola Coq. (Plate vii, fig. 32.)

Coquillett, Canadian Entomologist, xxvii, 106 (1895).

Black, subshining, dorsum often brown, antennæ and halteres concolorous; the palpi and the legs, including front coxæ, yellowish. Dorsum with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Tibiæ destitute of stout setæ on the outer side, hind ones microscopically setulate; costal vein not quite extending to the middle of the wing, ciliate with short bristles. Third vein forked near the apex; tip of first vein just beyond the middle of the distance between the humeral cross-vein and tip of the third vein; fourth vein gently curved for its whole length, the cell in front of it scarcely wider than the narrowest part of the one behind it. Abdomen bare in both sexes.

Length 1-1.5 mm.

Type locality, Las Cruces, New Mexico (Cockerell).

Bred from larvæ infesting a tree fungus (*Trametes peckii*), which was inhabited by coleopterous insects belonging to the genus *Cis*.

I have examined three female specimens, from the original type lot, very kindly loaned by the U. S. National Museum. The hind femora are quite broad, darkened at the tips and fringed below on basal half with curved black hairs.

I have a number of specimens from New Bedford, Mass. (Hough), and Ithaca, N. Y. (Comstock), which come very close to this species. They differ by their light-colored halteres. These I have designated as *fungicola* var. in the table of species.

Aphiochæta nigriceps Loew. (Plate vii, fig. 34.)

1866. Phora nigriceps, Loew., Centuries, vii, 99.
1879. Phora aletiæ, Comstock (teste Coquillett), Rept. U. S. Dept. of Agriculture, pp. 208-211.
1892. Phora nigriceps, Aldrich, Canad. Ent., xxiv.
1895. Phora nigriceps, Coquillett, Canad. Ent., xxvii, 103.

Yellowish, the color of the thorax often varying into red, sometimes into brown. Head black; front wide, subconvex, lightly punctulate, with a very faint, median, longitudinal, impressed line; the anterior setæ directed downward. Antennæ black, in immature specimens brown; palpi yellow. Pleuræ below the wings and between the middle and hind coxæ generally with black markings. Metanotum generally brown or blackish. Abdomen in immature specimens wholly clay-yellow, in mature ones the first segments, except the posterior margins, almost entirely brown, the remainder with brown sides. Feet pale yellowish, extreme apex of the hind femora black, front tibiæ without setæ, the others with a single row of very minute setulæ above. Halteres yellow; wings subhyaline, very slightly tinged with grayish yellow; costa with small cilia; veins brown, second heavy one forked, the fourth light one entire and distinct.

Original description translated.

Thorax with two dorsocentral macrochætæ and four marginal scutellar bristles. Cheeks each with two stout macrochætæ. First vein ending midway between humeral cross vein and tip of third vein; costa ending beyond the middle of the wing, its bristles rather short. Palpi of ♂ with very small bristles and distinctly enlarged.

This form is related to *P. picta* Lehm, but differs by its black head and the longer bristles on the costal vein.

New Bedford, Mass. (Hough); Algonquin, Ill. (Nason); Knoxville, Tenn. (Summers); Ithaca, N. Y.; Austin, Texas, bred from an artificial nest of the ant *Pogonomyrmex barbatus* (Wheeler); Wood's Hole, Mass. (Brues).

This is a species which is widely distributed in the eastern part of the country, and is by far the most variable one that I have examined. The lateral pair of scutellar bristles varies from extremely small to the size of the other pair. The color also varies greatly. The head is always black, but the rest of the body may be pale yellow or brownish.

Specimens from New England and the northern parts of the country are the most typical and agree very well with the original types at Cambridge, with which I have compared them.

Aphiochæta scalaris Loew. (Plate vii, fig. 33.)

Loew, Centuries, vii, 100.

Length 2.5-2.6 mm. Yellowish, the color of the thorax sometimes a little darker. Head, antennæ and palpi yellowish; front broad, subconvex, finely punctured, and with a fine median impressed line; both pairs of proclinate setæ well developed. Pleuræ immaculate, dorsum with one pair of dorsocentral macrochætæ and four marginal scutellar bristles; metanotum yellowish. Abdomen luteous or ochraceous, hind margin of first segment narrowly, the side and hind margins of the other segments very broadly black. Legs pale yellow, the

apices of the hind femora black. All the tibiæ ciliated above with setulæ, those on the four posterior tibiæ being very distinct. Wings subhyaline, very faintly yellowish, costal bristles rather short, veins dark, seventh vein distinct.

Represented by specimens from St. Vincent and Grenada, W. I. Some of these I have compared with the original types in the Museum of Comparative Zoology at Cambridge. They agree well in all details. There are also two specimens—one from Natrona, Pa., and one from Philadelphia, Pa. (Johnson)—which are less typical, but belong to this species.

Aphiochæta aurea Aldrich. (Plate vii, fig. 35.)

Aldrich, Trans. Ent. Soc. Lond., 1896, 437.

Yellow, lower frontal bristles proclinate, second vein forked, the abdomen, or at least the dorsal part, reddish orange in color. Front, antennæ and palpi yellow, arista yellow at base. Dorsum with one pair of dorsocentral macrochætæ and four marginal scutellar bristles; thorax wholly yellow; halteres yellow, in some cases brownish about the apex. Legs wholly yellow, the tarsi scarcely darker; middle and hind tibiæ each with a row of nearly a dozen small bristles, running down the posterior edge; hind femora moderately thickened, with a few very small bristles below near the tip. Abdomen bright reddish-orange in color, toward the apex and below irregularly blackened. In one specimen, a male, the reddish color is confined to the base, and there is a well-defined black spot on each side of the middle of the dorsum. Wings quite deeply tinged with yellow, the heavy veins reaching far out beyond the middle of the wing; costal bristles very short; fourth vein but little curved, ending at or but little before the apex of the wing; tip of first vein about equally distant from the humeral cross-vein and from the tip of the third; seventh vein distinct to the border.

Length 1.3-1.7 mm.

I have seen the original types from St. Vincent, W. I., and also several specimens from the Island of Grenada, W. I.

This species is remarkable for the extreme length of the costal vein and the bright orange-red color of the abdomen. It comes very close to *scalaris* Lw., but the costa is longer and its cilia are stouter and more thickly placed. The lower pair of proclinate setæ are also much weaker than in *scalaris*.

Aphiochæta magnipalpis Aldrich. (Plate vii, fig. 36.)

Aldrich, Trans. Lond. Ent. Soc., 1896, 438.

Male. Head, thorax, antennæ and abdomen black; palpi, pleuræ and halteres brownish black. The palpi in the male are enlarged, divaricate, and destitute of the usual strong setæ. Thorax with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Wings hyaline, the light veins very slender, tip of first vein just midway between the humeral and the fork of the third, on the costa. Fifth vein with a much greater curvature than usual, almost parallel with the vein before it, ending but little behind the apex of the wing. Legs rather stout, hind tibiæ not ciliate with bristles, or setulose.

Length 1-1.25 mm.

St. Vincent, W. I., sea level to 1000 feet, May. Four males and four females. The female is lighter and more variable, and has the palpi normal.

Besides the original specimens from St. Vincent, there are in the material at hand ten specimens of both sexes from the Island of Grenada, W. I. The female of this species is most easily recognized by the peculiar curvature of the fifth vein in the wing.

Aphiochæta giraudii Egger.

Egger, Verh. d. k. k. zool-bot. Gesell. (1862), 1235.
Slosson, Entomological News, vi, 7 (1895).
Becker, Monog. Phoridæ, p. 58 (1901).

Thorax reddish brown or black, scutellum with four bristles. Abdomen black, with very narrow yellow bands. Halteres and legs yellow; hind femora distinctly blackened, their tibiæ with distinct ciliation above. Costal vein reaching slightly beyond the middle of the wing. Tip of first vein very near to the second, twice as far from the humeral cross-vein; fourth vein recurved at the tip. Head black, antennæ fuscous, palpi yellow.

This European species was first found in North America by Mrs. Slosson, in the White Mountains, New Hampshire. I have seen no American specimens.

Aphiochæta halictorum M. et B. (Plate vii. fig. 37.)

Melander and Brues, Biological Bulletin, v, 14 (1903).

Head black, subshining; antennæ black; palpi dull yellow; front long, flattened, punctured and shining, its bristles small, the middle row high up; proclinate ones small. Dorsum black, subshining, finely pubescent, the pleuræ lightly pruinose, ten bristles present on the hind edge of the mesonotum, dorsum with one pair of dorsocentral and four marginal scutellar bristles. Abdomen black, shining, lightly pruinose basally along the sides. Legs piceous, front legs somewhat lighter, front coxæ dull yellowish, middle and hind coxæ piceous. Hind femora rather stout; all the tibiæ with short bristles, biserially arranged on their outer side, those of the front tibiæ ten to twelve in number and approximated into one line towards the inner forward edge; those of the other tibiæ in two separated series; hind tibiæ with seven in the outer and ten in the inner row. Middle tibiæ with one long spur, hind ones with two moderately long ones. Wings hyaline; heavy veins nearly black, reaching nearly to the middle of the wing; costal bristles fine and short, thickly placed; fourth vein slightly flexed only at its extreme base; seventh vein distinct. Halteres pale.

Length 1.5–2.25.

This species is distinguished by the presence of four scutellar bristles and the row of small bristles on the middle and hind tibiæ. It is a very distinct species.

Aphiochæta minuta Aldrich. (Plate vii, fig. 38.)

Aldrich, Canadian Entomologist, xxiv, 146.

Head black; the front broad, shining, convex, with a few minute hairs slant-

ing toward the middle line; the usual bristles rather small; ocellar prominence defined by a very fine impressed line which continues down the front. Antennæ brownish black. Palpi brownish, with a few black bristles at the tip. Proboscis small, yellow. Dorsum of thorax with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Abdomen black, tapering in the female, with the last segment slender and cylindrical. Halteres light yellow. Wings infuscated with brown, except toward the posterior border; costal vein not reaching quite to the middle of the wing, with short and delicate bristles; third vein furcate. Light veins four in number; fourth vein nearly straight. Front legs yellow at the coxæ, gradually browner toward the tarsi, without any conspicuous bristles; middle legs brown, with a long spur at the apex of each tibia. Hind legs black, apex of each tibia with a single long spur; about seven short bristles form a row down the back side of the apical half of the tibiæ.

Length 1.2 mm., of wing 1.3 mm.

Type locality, Brookings, South Dakota. Bred from a cocoon of *Cimbex americana* Leach, which emerged June 1st.

Numerous specimens which agree well with the type. Nearly all, however, are larger and darker, especially the palpi and legs, which are often blackish. The wings are also quite strongly infuscated in fully mature specimens. The palpi are rather broader at the tips than usual.

South Dakota (type, Aldrich); New Bedford, Mass. (Hough); Boontown, N. J. (Greene); Hagerman, Idaho (Aldrich); Ithaca, N. Y. (Comstock); Monterey, Cal. (Wheeler), and Salinville, Ohio.

This species is very readily recognized by its long and narrow brownish wings and stout posterior tibiæ, which are very strongly setulose.

Aphiochæta furtiva Aldrich. (Plate vii, fig. 39.)

Aldrich, Trans. Ent. Soc. London, 1896, 436.

Female. Head, thorax and abdomen black; legs brownish, the tarsi and anterior tibiæ yellow. Front black; the bristles rather below medium size, the fine hairs somewhat conspicuous. Antennæ blackish, more or less yellowish at base; palpi yellow. Dorsum of thorax subshining, with one pair of dorsocentral macrochætæ and two marginal scutellar bristles; pleuræ shining black. Halteres black. Femora in fully colored specimens dark brown, in less mature ones yellowish brown, the tibiæ lighter; hind tarsi almost twice the length of the tibiæ. Hind tibiæ on the posterior edge delicately lined with black, on the inner side of this with a row of about twelve setulæ. Wings slightly yellow, the heavy veins reaching well past the middle of the wing, first vein reaching barely more than half way from the humeral vein to the fork of the third, on the costa; fourth and fifth veins ending about equally far from the apex of the wing; seventh vein almost obsolete.

Length 1.5 mm.

This species comes nearest to the European *ciliata* Zett., from

which it differs in not having the hind femora enlarged; the costal vein is longer also, and the halteres black.

Besides the types of this species, I have seen two additional specimens from St. Vincent. All are females. The altitudes at which the specimens were captured vary from sea-level to 1500 feet.

Aphiochæta rufipes Meigen. (Plate vii, fig. 40.)

Meigen, Classification, i, 313, 3.
Zetterstedt, Ins. Lapp., 795, 3.
Zetterstedt, Dipt. Scand., vii, 2857.
Schiner, Fauna Austr., ii, 340.
Coquillett, American Naturalist, xxxi, 386.
Coquillett, Proc. Wash. Acad. Sci., ii, 437.
Becker, Monog. Phoridæ, p. 59.

Male. Length 2.5–3 mm. Thorax and abdomen black, the former somewhat shining, on the dorsum with unusually thickly placed short brown hairs. Scutellum with only two marginal bristles, and dorsum with one pair of dorsocentral macrochætæ. Head and antennæ black, third antennal joint of moderate size, with a long pubescent arista. Front gray pollinose, its bristles placed as usual; palpi yellow, with long bristles; head with a row of long bristles reaching up from the border of the eye to the middle of the face. Halteres yellow. Abdominal segments rather thickly covered with long, perfectly erect, blunt bristles; the sutures between the segments often yellow. Legs and coxæ varying from brown to reddish yellow; hind femora not especially widened, usually a little darker at the tips. Wings hyaline; the costal vein reaching about to the middle of the wing, its bristles very long; first segment of the costal vein about one and one-half times as long as the second.

The female lacks the peculiar abdominal bristles which are so conspicuous in the male.

There are about forty specimens before me, representing both sexes of this species, from various parts of the United States, as follows: New Bedford, Mass. (Hough); Moscow, Idaho (Aldrich); Michigan; Pennsylvania; Algonquin, Ill. (Nason); New York City (Brues); Chicago, Ill. (Melander).

From this it can be seen that the species is very widely distributed in this country.

All agree exactly with the description given by Becker of European specimens, of which I have given a translation above.

Aphiochæta albidohalteris Felt.

Felt, Twelfth N. Y. Report, 228.

Female. Head and thorax jet black; palpi orange yellow; abdomen black in some specimens, in others the lateral margins and dorsum of terminal segments are dull yellow. Wings hyaline, heavy veins ochreous. Halteres brownish black at base, the knob yellowish white; legs a variable ochreous, with the terminal

segments darker. Ocellar triangle defined by a suture which extends down the front; anterior frontal bristles proclinate. Dorsum of thorax dull, thickly pubescent, with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Costal vein less than half the length of the wing; first vein joining the costa near its apical third; third vein forked; costa fringed with strong bristles; fourth vein nearly straight. Fore tibiæ unarmed, middle and posterior ones fringed with stout spines posteriorly, each with a large apical spine. Tarsi about one-fourth longer than the tibiæ.—(Condensed and elaborated from original description.)

Length 1.92 mm., of wing 2.4 mm.

I have seen two females of the original type lot, which were very kindly loaned to me by Mr. C. W. Johnson. This species comes very close to the European *rufipes* Meig., but the females differ from those of *rufipes* in having the fourth vein evenly curved for its entire length. The costa is also a trifle shorter, not quite reaching to the middle of the wing, and the first vein ends nearer to the tip of the third.

Type locality, New Brunswick, N. J.

I cannot find the stout spines mentioned in the description of the posterior tibiæ. In the two specimens which I have seen the tibiæ show only a faint suggestion of ciliation.

Aphiochæta agarici Lintner. (Plate vii, fig. 41.)

Lintner, Tenth N. Y. Report, p. 399.

Aldrich (*P. setacea* female, nec male), Canad. Ent., xxiv, 141, figs.

Male and female. Black, antennæ fuscous; knob of halteres yellowish white, front and middle legs yellowish brown, tarsi brownish, hind legs darker; palpi yellowish. Wings hyaline.

Ocellar triangle defined by a suture which extends down the front; anterior frontal bristles proclinate. Dorsum of thorax thickly pubescent, with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Costal vein not reaching to the middle of the wing. Apex of the first vein nearer to the tip of the second vein than to the humeral cross-vein; third vein forked; costal vein fringed with strong setæ; fourth vein curved both at the base and apex. Front tibiæ unarmed, middle tibiæ with a very long posterior apical spine; hind tibiæ with one long anterior and several short apical internal spines. Anterior edge of middle and posterior edge of hind tibiæ fringed with a thick row of stout setulæ; internally and closer to the hind margin of the hind tibiæ there is a row of about nine stouter spines on the apical three-fourths. Hypopygium of male with an irregular dorsolateral plate, the ventral portion of which is prolonged. Two pairs of organs extend from the plate, an upper straight pair bearing numerous long setæ along the entire surface, and a lower pair, slightly curved ventrally and bearing several long, usually sharply curved setæ at their tips.

Length 1.5-2 mm., of wing 1.75-2.25 mm.

Closely related to *P. setacea*, but in this species the anterior row of frontal bristles form a nearly straight transverse row, while in

setacea the middle ones are placed further forward than the lateral ones. The anterior pair of proclinate bristles are also relatively smaller and more nearly in front of the middle pair. The costal vein is much shorter in *agarici* and the first vein ends nearer to the tip of the third than in *setacea*.

The female which Aldrich described as *setacea* belongs to *agarici*, while the male, which is a distinct species, stands as the type of *setacea*.

Aphiochæta setacea Aldrich. (Plate viii, fig. 42.)

Aldrich, Canadian Entomologist, xxiv, 144, figs.

Head black, front very wide, with an ocellar prominence and median furrow. All the frontal bristles large and strong, the four anterior ones proclinate. Antennæ fuscous, palpi yellow with black bristles. Dorsum of thorax clothed with brownish pubescence; scutellum with two marginal bristles. Legs yellowish, hind pair brownish, posterior tibiæ each with a single spur. Coxæ with a few bristles on the outer and apical portions; the posterior coxæ with a conical protuberance on the hind side. Hypopygium lying close up under the back part of the abdomen. Wings slightly grayish, veins yellowish brown, costa reaching nearly to the middle of the wing, provided with very long bristles. First vein ending midway between the humeral cross-vein and the tip of the third, fourth vein not much curved, almost straight except at extreme base and apex, seventh vein distinct. Halteres yellow.

Length 1.2 mm., of wing 1 mm.

Type locality, Brookings, South Dakota.

This species is closely related to the European *P. rufipes* Meig., but lacks the peculiar bristles upon the abdomen of the male. The female is very much like *rufipes*, and when not associated with the male is almost impossible to distinguish. The costal bristles are, however, a little shorter and the wing more strongly tinged with yellow. Many specimens are considerably larger than the type (2-2.5 mm.)

Aphiochæta rostrata M. et B. (Plate viii, figs. 43, 44.)

Melander and Brues, Biological Bulletin, v, 15 (1903).

Female. Length 1.5 - 1.75 mm.—Head shining black, especially smooth and polished on the front and vertex. Front with the normal chætoxy, except that there are only two proclinate bristles at the lower edge. The front is also sparsley hairy, besides the large bristles; median longitudinal groove and ocellar tubercle unusually well marked. Antennæ black, arista distinctly plumose. Proboscis piceous, very large and strongly exserted, as long as the head height. It is rather slender at the base where the rather small bristly spindle-shaped black palpi are inserted, swollen and bifurcated at the extremity. The bifurcation is produced by a splitting of the apex by a horizontal slit in the probocis. Thoracic dorsum shining, hairy as usual, with one pair of dorsocentral and two marginal

scutellar bristles. Abdomen black, nowhere bristly. Legs pale yellow, the tarsi sometimes brownish, hind tibiæ very distinctly ciliated and with a single weak spur, as have also the middle pair. On the inner side at apex, the posterior pair have several transverse rows of short black bristles. Wings yellowish hyaline, the costal vein reaching distinctly beyond the middle of the wing and with very short cilia; first vein ending a little closer to the tip of the second than to the humeral cross-vein; fourth vein evenly arcuate, fifth vein sinuate as is also the sixth; seventh vein present. Halteres yellowish, blackened at the tips.

The original types from Wood's Hole, Mass., are before me.

This species can easily be recognized by the peculiar form of the proboscis in the female. The shiny black head and thorax and contrasting light yellow legs are also quite characteristic.

Aphiochæta pulicaria Fallen. (Plate viii, fig. 45.)

Fallen, Dipt. Suec., Phytomyzides, 7, 6.
Meigen, Syst. Beschr., vi, 217, 16.
Zetterstedt, Ins. Lapp., 754, 4.
Schiner, Fauna Austriaca, 11, 341.
Strobl, Phoriden Oesterreichs, 202.
Becker, Monog. Phoridæ, 62.

Male.—Head, thorax and abdomen black, sometimes slightly brownish. Thorax covered with short brownish pubescence; but little shining; with a single pair of dorsocentral macrochætæ and two marginal scutellar bristles. Third antennal joint of medium size, with pubescent arista. Palpi yellow or reddish brown. halteres yellow or yellowish brown. Abdomen dull black, sometimes brownish. Legs varying from yellowish to dark brown; hind femora rather wide and darkened toward the tips; hind tibiæ with a black line above, very delicately ciliated. Wings often slightly tinged with brown, the veins brown; costal vein reaching to the middle of the wing, with long and well separated bristles; tip of first vein about one and one-half times as far from the humeral cross-vein as from the tip of the third.

There is a large number of specimens before me which agree well with European specimens from Strobl and with Becker's description of this species. Very often the body is brownish and the wings clear hyaline, but all seem undoubtedly to belong to this species.

The species is very widely distributed in Europe, Siberia, Northern Africa and the following localities in the United States: Massachusetts, Louisiana, South Dakota, Idaho and California. It is therefore practically circumpolar in its distribution.

Aphiochæta cata M. et B.

Melander and Brues, Biological Bulletin, v, 16 (1903).

Male and Female. Length .8—1.2 mm.—Head black, front short, as about as wide as long, subshining, faintly gray pollinose in the male, two anterior bristles proclinate, the others all present and arranged as usual. Antennæ wholly black in the male, in which sex the third joint is enlarged and ovate so as to be very

setacea the middle ones are placed further forward than the lateral ones. The anterior pair of proclinate bristles are also relatively smaller and more nearly in front of the middle pair. The costal vein is much shorter in *agarici* and the first vein ends nearer to the tip of the third than in *setacea*.

The female which Aldrich described as *setacea* belongs to *agarici*, while the male, which is a distinct species, stands as the type of *setacea*.

Aphiochæta setacea Aldrich. (Plate viii, fig. 42.)

Aldrich, Canadian Entomologist, xxiv, 144, figs.

Head black, front very wide, with an ocellar prominence and median furrow. All the frontal bristles large and strong, the four anterior ones proclinate. Antennæ fuscous, palpi yellow with black bristles. Dorsum of thorax clothed with brownish pubescence; scutellum with two marginal bristles. Legs yellowish, hind pair brownish, posterior tibiæ each with a single spur. Coxæ with a few bristles on the outer and apical portions; the posterior coxæ with a conical protuberance on the hind side. Hypopygium lying close up under the back part of the abdomen. Wings slightly grayish, veins yellowish brown, costa reaching nearly to the middle of the wing, provided with very long bristles. First vein ending midway between the humeral cross-vein and the tip of the third, fourth vein not much curved, almost straight except at extreme base and apex, seventh vein distinct. Halteres yellow.

Length 1.2 mm., of wing 1 mm.

Type locality, Brookings, South Dakota.

This species is closely related to the European *P. rufipes* Meig., but lacks the peculiar bristles upon the abdomen of the male. The female is very much like *rufipes*, and when not associated with the male is almost impossible to distinguish. The costal bristles are, however, a little shorter and the wing more strongly tinged with yellow. Many specimens are considerably larger than the type (2–2.5 mm.)

Aphiochæta rostrata M. et B. (Plate viii, figs. 43, 44.)

Melander and Brues, Biological Bulletin, v, 15 (1903).

Female. Length 1.5 - 1.75 mm.—Head shining black, especially smooth and polished on the front and vertex. Front with the normal chætoxy, except that there are only two proclinate bristles at the lower edge. The front is also sparsley hairy, besides the large bristles; median longitudinal groove and ocellar tubercle unusually well marked. Antennæ black, arista distinctly plumose. Proboscis piceous, very large and strongly exserted, as long as the head height. It is rather slender at the base where the rather small bristly spindle-shaped black palpi are inserted, swollen and bifurcated at the extremity. The bifurcation is produced by a splitting of the apex by a horizontal slit in the probocis. Thoracic dorsum shining, hairy as usual, with one pair of dorsocentral and two marginal

scutellar bristles. Abdomen black, nowhere bristly. Legs pale yellow, the tarsi sometimes brownish, hind tibiæ very distinctly ciliated and with a single weak spur, as have also the middle pair. On the inner side at apex, the posterior pair have several transverse rows of short black bristles. Wings yellowish hyaline, the costal vein reaching distinctly beyond the middle of the wing and with very short cilia; first vein ending a little closer to the tip of the second than to the humeral cross-vein; fourth vein evenly arcuate, fifth vein sinuate as is also the sixth; seventh vein present. Halteres yellowish, blackened at the tips.

The original types from Wood's Hole, Mass., are before me.

This species can easily be recognized by the peculiar form of the proboscis in the female. The shiny black head and thorax and contrasting light yellow legs are also quite characteristic.

Aphiochæta pulicaria Fallen. (Plate viii, fig. 45.)

Fallen, Dipt. Suec., Phytomyzides, 7, 6.
Meigen, Syst. Beschr., vi. 217, 16.
Zetterstedt, Ins. Lapp., 754, 4.
Schiner, Fauna Austriaca, 11, 341.
Strobl, Phoriden Oesterreichs, 202.
Becker, Monog. Phoridæ, 62.

Male.—Head, thorax and abdomen black, sometimes slightly brownish. Thorax covered with short brownish pubescence; but little shining; with a single pair of dorsocentral macrochætæ and two marginal scutellar bristles. Third antennal joint of medium size, with pubescent arista. Palpi yellow or reddish brown. halteres yellow or yellowish brown. Abdomen dull black, sometimes brownish. Legs varying from yellowish to dark brown; hind femora rather wide and darkened toward the tips; hind tibiæ with a black line above, very delicately ciliated. Wings often slightly tinged with brown, the veins brown; costal vein reaching to the middle of the wing, with long and well separated bristles; tip of first vein about one and one-half times as far from the humeral cross-vein as from the tip of the third.

There is a large number of specimens before me which agree well with European specimens from Strobl and with Becker's description of this species. Very often the body is brownish and the wings clear hyaline, but all seem undoubtedly to belong to this species.

The species is very widely distributed in Europe, Siberia, Northern Africa and the following localities in the United States: Massachusetts, Louisiana, South Dakota, Idaho and California. It is therefore practically circumpolar in its distribution.

Aphiochæta cata M. et B.

Melander and Brues, Biological Bulletin, v, 16 (1903).

Male and Female. Length .8—1.2 mm.—Head black, front short, as about as wide as long, subshining, faintly gray pollinose in the male, two anterior bristles proclinate, the others all present and arranged as usual. Antennæ wholly black in the male, in which sex the third joint is enlarged and ovate so as to be very

conspicuous; in the female they are of the usual size and slightly yellowish at the base; arista pubescent. Palpi light yellow, strongly bristly. Proboscis of female projecting, stout and horny. Thorax shining black, hairy, with one pair of dorsocentral and two marginal scutellar bristles. Abdomen black. Legs yellowish brown, the anterior pair lighter. Posterior femora ciliated below on apical half, their tibiæ without any rows of small bristles on the outer side; four posterior tibiæ each with a single delicate apical spur. Wings hyaline, the costal vein not quite reaching to the middle of the wing, its cilia short and closely placed. Third vein far from the costa at its base and forked very near the apex. Tip of first vein one and two-thirds times as far from humeral vein as from the tip of the third; fourth vein slightly but evenly curved, recurved at the extreme tip; fifth vein slightly diverging from the fourth to its tip, which is as far behind the wing tip as the fourth is before it; seventh vein faint but distinct. Halteres yellowish in the female, piceous in the male.

I have seen only the original types of this species, which are from Wood's Hole, Mass.

It is quite easily known by the stout, horny proboscis of the female and the enlarged third antennal joint of the male.

Aphiochæta (?) sp. innom. (Plate viii, fig. 46.)

There is a single male, collected by Mr. C. W. Johnson, at Delaware Water Gap, N. J., July 12th, which belongs to an undescribed species. As the antennæ and palpi of the specimen are lost, I have not undertaken to describe it. It can be readily recognized by the fact that the hind tarsi are enlarged and flattened (see fig. 46). *Dahli* Beck. and *coronata* Beck. have the fore tarsi enlarged in the male, but this is the only form, so far as I am aware, in which the hind tarsi are peculiar. There are no proclinate bristles on the front, but the absence of bristles on the legs and the presence of a median furrow on the front indicate its position here. There are only three rows of frontal bristles, the lower two of which consist of two median reclinate bristles only.

APOCEPHALUS Coq.

Coquillett, Proc. Ent. Soc. Wash., iv (1901).

Head hemispherical, eyes large, Front broad, its bristles all reclinate, arranged in four rows; anterior row consisting of two median, next row of two, and two upper rows each of four bristles. Ocelli large. Antennæ large, their cavities small, third joint oval or conical, with an apical arista. Proboscis small, palpi with few and very weak bristles. Thorax strongly arched above. Wings large, the third vein forked near the apex, four light veins present. Legs rather long and slender, without bristles except for one tibial spur on each of the pos-

terior legs, hind tibia with fine setulæ. Ovipositor of female very stout and heavily chitinized, black, more or less shovel-shaped and blunt at the tip.

This genus resembles *Melaloncha*, but differs by the broad front, bare legs, forked third vein, and blunt ovipositor. It is represented by two species, both from the United States.

Table of Species.

1. Ovipositor shovel-shaped, twice as long as broad, broad at base and equally so at apex, constricted at the middle. Front black..**pergandei** Coq.
   Ovipositor narrow, pointed bluntly at the apex, four times as long as broad. Front yellow.....**wheeleri** sp. nov.

Apocephalus pergandei Coq. (Plate viii, figs. 47, 48.)

Coquillet, Proc. Ent. Soc. Wash., iv (1901).

Female. Length 2 mm.—Yellow, except front, ovipositor and markings upon abdomen. Front black, not shining, about as broad as long, ocellar tubercle and impressed median line very distinct, bristles of second frontal row two in number and placed near to the eye margin. Antennæ lemon-yellow, third joint oval, rather large, with a short, almost bare black arista. Palpi very small and hardly at all bristly, yellow. Cheeks each with two rather small macrochætæ. Thoracic dorsum yellow, with a single pair of dorsocentral macrochætæ and two strong marginal scutellar bristles. Second to fifth abdominal segments each with lateral black spots; second also with a pair of more median ones; sixth segment black, ovipositor piceous; venter yellow, except the last segment which is black; sides of all the segments, especially the third to sixth, fringed with stiff black hairs. Ovipositor flat, shovel-shaped, twice as long as broad, as wide at apex as at base and constricted in the middle. Legs pale yellow, hind tibiæ and all the tarsi lined with black. Hind tibiæ delicately setulose behind, their femora weakly ciliated with black hairs below near the apex. Spurs of middle and hind tibiæ long. Wings rather long and of even width, costal vein reaching not quite to the middle of the wing, its cilia very fine and closely placed. First vein ending two-thirds of the way from the humeral cross-vein to the tip of the costal; second vein very close to the third at its tip, *i. e.*, angle of furcation very acute; fourth vein evenly curved, seventh vein distinct. Halteres pale, black at extreme tips.

I have seen two females belonging to this species,—one from Frankford, Pa., collected by Mr. H. W. Wenzel, and kindly loaned to me by Mr. C. W. Johnson, and another specimen from Austin, Texas, found in a nest of *Camponotus maculatus*, var. *sansabeanus* Bkly., by Mr. A. L. Melander.

Apocephalus wheeleri sp. nov. (Plate viii, fig. 49.)

Female. Length 2 mm., of wing 2.7 mm. Wholly yellow, ocellar tubercle, a spot below each wing and posterior part of middle coxæ brown, ovipositor shining black. Head yellow, front more than twice as wide as long. The bristles of the second frontal row placed in the middle and almost above the lowest pair of re-

clinate ones. Third joint of antennæ are very large, broadly lancet-shaped with a very short, stout and bare, black apical arista. Palpi slightly elongated and projecting, with only very weak bristles below. Cheeks each with two small macrochætæ. Thoracic dorsum yellow, with a single pair of dorsocentral macrochætæ and two strong marginal scutellar bristles. Abdomen without hairs laterally, the sixth segment elongated. Ovipositor narrow, pointed bluntly at the apex, four times as long as broad. Legs very long and slender; hind tibiæ lined with black above and obsoletely setulose. Wings yellowish hyaline, very large; the costal vein reaching to the middle of the wing, its cilia of moderate length, but close and very fine. Tip of first vein scarcely nearer to the tip of the costal than to the humeral cross-vein; second vein not close to the third at its apex, i. e., angle of furcation not very acute; fourth vein slightly and evenly curved; seventh vein distinct. Halteres pale yellow.

Described from a single female collected at Pine Lake, Wis., June 7, 1890, by Dr. Wm. M. Wheeler, after whom I take great pleasure in naming this species.

The appearance of the female palpi indicates that in the male these organs will be found to be much enlarged.

The habits of the present species are not known, but close structural similarity with *A. pergandei* suggest that it probably lives parasitically on ants, like the latter.

MELALONCHA gen. nov.

Moderately large species with long and narrow wings; head hemispherical; eyes large. Front narrow, twice as high as broad and with no median groove or ocellar tubercle. Frontal bristles all reclinate, in four transverse rows; the ocellar row consisting of four bristles and the lower ones of two each, the median ones being absent in these rows. Antennæ inserted very low down; elongate oval, pointed at tip and with apical arista. In addition to being greatly elongated they are curved upward, due to an arcuation of the third joint. Palpi small, with delicate bristles. Thorax and abdomen normal in the male. In the female the abdomen is very slender and ends in an asymetrical, sharply pointed, very heavily chitinized ovipositor. Anterior *femora* each with a small macrochæta on outer side just before the knee. Middle tibiæ with no bristles except a single apical spur. Posterior femora rather slender in the female, stouter in the male. Hind tibiæ fringed above in both sexes with a series of stout bristles; with two apical spurs. Wings longer and narrower than usual, costal vein with minute bristles; third vein not forked at tip; four light veins present. Pulvilli and empodium well developed.

Melaloncha pulchella sp. nov. (Plate ix, fig. 60.)

♂, ♀. Length 2 mm., of wing the same. Head deep orange, macrochætæ and interocellar space black. Front shining, highly polished. Antennæ and palpi lighter yellow, especially the palpi; arista piceous, swollen at base, finely pubescent. Palpi with very delicate bristles. Dorsum of thorax piceous black in the male, brownish yellow in the female. Pleuræ black in the male, with a large yellow mark just below the humeri; in the female wholly yellow. Thorax with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Abdomen of male black, in certain lights with a very fine bluish iridescence in bands anteriorly on the segments; female abdomen black, with yellow bands anteriorly on each segment, the yellow being pruinose with bluish white, as in the male. Sixth segment twice as long as the others; ovipositor narrow, black, polished and pointed; as long as the rest of the abdomen. Seen from the side, it is slightly arcuate downward; from above it is asymetrical, being bent toward the left just beyond the middle. Legs yellow, except the hind tibiæ and apical part of hind femora in the male. Posterior tibiæ fringed above in both sexes with a series of very large bristles, which are longest apically. Wings distinctly brownish; nervures piceous, costal vein reaching to the middle of the wing, its bristles extremely minute. First vein ending a little nearer to the third than to the humeral cross-vein; veins four to seven strong, but little curved. Halteres yellow.

Described from a single male and female from Songo, Bolivia, South America (Kertész).

This peculiar form is represented in the collection by a pair of specimens (♂, ♀), which were very kindly sent by Dr. Kertész. Its general appearance recalls at once the genus *Apocephalus*; but it is seen to differ from the latter by the shape of the front, the simple third vein, and form of wings and bristles on hind tibiæ. So similar are the antennæ and ovipositor in the two genera that one can almost predict that its habits will be found to resemble closely those of *Apocephalus pergandei*.

I have seen only the description of the European *Phora formicarum* Verrall, but it evidently has some affinities with the present species. There are so many differences, however, that a comparison only could determine their generic relations.

The *Phora stylata* of Schiner (Novara Reise, Dipt. 224), from the description, is evidently very closely allied to this species, and I do not hesitate in placing it here. It differs from *M. pulchella* in color and in the form of the ovipositor, which is provided with two points at the apex instead of one, as in *pulchella*.

TRINEURA.

Meigen, Illiger's Mag., ii, 276 (1803).
Meigen. Klassif., 312 (1804).

Front in the male rather narrow, only about one fifth the width of the head, in the female one-third or one-fourth. Frontal bristles twelve in number, all reclinate, the lower ones in the middle smaller than the others; arranged in four transverse rows, on the vertex four, then follow three rows each of two lateral bristles; below the ocelli are two more bristles which are somewhat nearer to the middle. Cheeks without bristles. Fore tibiæ unarmed, middle tibiæ on the posterior part of the upper surface with a row of very long setæ in the male, four to six in number, in the female only two, rarely three. In both sexes there are setæ also on the fore and hind tibiæ. Dorsum of the thorax with no longer hairs and bristles than in other genera; velvety; with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Third vein of wing not forked, first running parallel with the costa rather far from it, then making a somewhat abrupt turn toward it, ending about half way between the humeral and costal. Auxiliary vein distinct, ending in the first longitudinal just before the latter turns forward. Antennæ rounded, with dorsal arista, palpi small, bristly only at the tips. Eyes bare.

The venation and abundance of short velvety hair upon the dorsum of the thorax, afford the essential generic difference.

Table of Species.

1. Front tarsi not enlarged or widenend in either sex, costal vein not quite attaining the middle of the wing, third vein far from costa at base. **aterrima** Meig.

   Front tarsi enlarged and flattened in both sexes, more distinctly so in the female, third vein nearer to costa at base, costa reaching to or beyond the middle of the wing.....

2. Front tarsi very strongly flattened and enlarged, fourth vein curved at base, straight at apex, ending before the wing tip....**montana** sp. nov.

   Front tarsi distinctly flattened, but not remarkably enlarged, fourth vein evenly curved, ending just beyond the wing tip....**velutina** Meig.

Under the first species I have traced somewhat the history of the genus. When Meigen became acquainted with Latreille's description of the genus *Phora*, he considered that it covered the same ground and withdrew his own genus *Trineura*.*

The genus is represented in North America by three species, one (*aterrima*) originally described from Europe and first recorded from this side of the Atlantic by Walker in his "List" (1849), and

* See Appendix, Note 1.

again quite recently by Coquillett as occurring in Alaska, Colorado and New Hampshire; by a second European species (*velutina*), and by a third which has not heretofore been described. All have passed in American collections as a single species.

Trineura aterrima Meig. (Plate viii, fig. 50.)

1764. Mouche noire avec un trait noir sur la moitié du bord extérieur de l'aile. Geoffroy, Hist. abreg. d. Ins. d. env. Paris, ii, 533, 76 (Meigen).
1794. **Musca aterrima**. Fabricius, Ent. System., iv, 334, 93.
1799. **Musca aterrima**, Coquebert, Illust. icon. Ins., Pl. 24, fig. 3.
1802. **Phora aterrima**, Latreille, Hist. Nat. Crust. et Ins., iii, 464.
1804. **Trineura atra**, Meigen, Klass. u. Beschr. eur. zw. Ins. 1. 2, 313, Pl. xv, fig. 22.
1804. **Phora aterrima**, Latreille, Hist. Nat. Ins. et Crust., xiv, 394; Dict. d'Hist. Nat., xxiv, 197, 594.
1805. **Tephritis aterrima**, Fabricius, Syst. Antl., 323.
1809. **Phora aterrima**, Latreille, Gen. Crust. et Ins., iv, 360.
1823. **Phora atra**, Fallen, Faun. Suec. Phytomyzides, 7, 7 (Schiner); Meigen says *Trineura atra*.
1830. **Phora atra**, Meigen, Syst. Beschr., vi, 224.
1830. **Phora stictica**, Meigen, l. c., vi, 225.
1849. **Phora aterrima**, Walker, List. etc., iv, 1138 (occurrence in N. A.).
1864. **Trineura aterrima**, Schiner, Fauna Austr. Dipt., ii, 349.
1892. **Trineura aterrima**, Strobl. Wien Ent. Zeit., xi, 204. (Reduces stictica to a variety.)
1901. **Trineura aterrima**, Becker, Monog. Phor., p. 80.

Geoffroy evidently did not apply a scientific name to the species. Coquebert probably referred to the species as *Musca aterrima*, but I can find no positive statement. The chronological order of the three publications in 1804 is unknown. Meigen in 1830 regarded his genus *Trineura* (1803) as a synonym of *Phora* Latr. (1796). I have not ascertained the name under which Walker referred to this species, but Osten Sacken records it from North America on his authority. As far as I know, Schiner was the first to use the name *Trineura* after Meigen himself discarded it.

Wholly deep velvet-black, in the female a little less intense. Wings hyaline, the heavy veins usually black, but sometimes only the costa is black and the others brown, costal vein reaching a little less than half the length of the wing. Fourth vein only a little curved, ending at the apex of the wing, seventh vein wholly absent or very indistinct, legs velvety black, fore tibiæ and tarsi yellowish or reddish, male abdomen bent in a nearly uniform curve for the most of its length. Hypopygium in consequence turned partially forward. Front tarsi not enlarged, middle and hind tibiæ with a single external bristle on the basal half. Middle tibiæ of male with four to six bristles on the hind side, female with only two or three.

Twenty-nine specimens. From Dr. Hough, one, New Bedford, Mass.; Mr. Johnson, five, Montgomery Co., Pa., May 26, 1895, and six, Natrona, Pa., July 13-30, 1895; University of Kansas, two, Lawrence, Kans.; Prof. Aldrich, one, Brookings, S. D.; four, Lawrence, Kans.; Dr. Wheeler, two, Chicago, July, 1895-96; one, Battle Creek, Mich.; one, New York City, May (Brues); three, Austin, Tex., and four, Chicago (Melander).

Trineura velutina Meig. (Plate viii, fig. 51.)

Meigen, Syst. Beschr. vi, 224, 38.

Like *aterrima*, but a little larger. In both sexes the front tarsi are distinctly flattened and enlarged, this is especially noticeable in the female. The costal vein reaches a little beyond the middle of the wing, and the third vein is not so far from the costa at its base as in *aterrima*. Costal cilia long and fine, but not very close. Hind tibiæ with one external bristle; middle tibiæ with five to seven bristles on the hind side in the male and two to three in the female, besides one or two bristles on outer side before the middle.

This common European species has never before been recorded from America. The two species are very closely allied, but easily separable, by the characters given in the table. *Velutina* has the more western range, occurring from California east as far as Massachusetts. *Aterrima* occurs also in the east, but I have seen no specimens from further west than Kansas and Texas.

Thirty eight specimens. Eight, Leland Stanford University, Cal.; nineteen, Moscow, Idaho (Aldrich); four, Los Angeles Co., Cal.; three, New Bedford, Mass. (Hough); two, Douglas Co., Kans. (University of Kansas), and one from Battle Creek, Mich.

Trineura montana sp. nov. (Plate vii, figs. 52, 53.)

Male. Length 1.8-3.5 mm. Wholly dull, opaque velvety black, except coxæ, legs, hypopygium and several spots on the pleuræ which are more or less shining. Front about one-fourth the width of the head, with the normal bristles, the pair of bristles below the ocelli not so close to the eye margin as the others; lower part of front on each side of the median line with a vertical row of about five small bristles which decrease in size upward. Antennæ small, oval, with dorsal arista; palpi small, bristly only at the tips. Legs black, except the front, which are brownish yellow. Front tarsi much widened and flattened, wider than their tibiæ, second and following joints as wide as or wider than long; middle tibiæ with five or six (usually five) bristles on hind side, on outer side with a single bristle; hind tibiæ with a single basal external bristle. Wings hyaline, often tinged with yellowish; costal vein reaching well beyond the middle of the wing, its cilia very short and fine; fourth vein sharply curved at base, straight at apex, ending just before the wing tip.

Female. Differs by its wider front (one-third the width of the head) and by having only two bristles on the hind side of the middle tibiæ. The front tarsi are also a trifle wider than in the male.

Described from four males and four females, collected in the Magdalena Mountains, New Mexico, by the late F. H. Snow; and from a single male from Kansas.

This species is close to *velutina*, but can be distinguished by its shorter costal cilia, more broadly widened front tarsi, and by the sharper basal curvature of the fourth vein in the wing.

CONICERA Meigen.

1830. Meigen, Syst. Beschr., vi, 226. Pl. lxiii, figs. 12, 13.
1864. Schiner, Fauna Austriaca, Dipt. ii, 335.
1835. Macquart, Hist. Nat. des Dipt. ii, 631. Pl. xxiv, fig. 6.

Third vein simple, mediastinal vein more or less obsolete. Tibiæ each with a single apical spur, outer side of middle and posterior tibiæ with two bristles near the base; pulvilli and empodia present. Antenna in male long and lancet-shaped, turned upward, the arista rather short, horizontal. In the female the third joint nearly round, yet with a distinct point where the basally thickened arista is inserted. Frontal setæ all reclinate, arranged in three rows; an upper one with four, a middle one of the same number, and a lower one of two setæ.

Table of Species.

1. Tip of male antenna reaching beyond the vertex, wings somewhat infuscated, middle tibiæ with four macrochætæ besides the apical spur. **aldrichii** sp. nov.
   Tip of male antenna not or just attaining the vertex, middle tibiæ with only three macrochætæ besides the apical spur.....2.
2. Wings pure hyaline, tip of antenna just reaching the vertex. ....**atra** Meig.
   Wings brownish, tip of male antenna not extending so far as the vertex. **atra** Meig. var., **neotropica** var. nov.

Conicera aldrichii sp. nov. (Plate ix, fig. 54.)

Male. Length 2.25 mm. Wholly black, nowhere shining; third joint of antennæ velvety black, produced into a very long point and reaching considerably above the vertex, feathered on its narrow portion; arista pubescent, thickened at base and a little shorter than the third antennal joint. Palpi prominent, slender, with numerous short bristles below. Thoracic dorsum opaque and sparsely black hairy; with a single pair of weak dorsocentral macrochætæ and a single large scutellar pair. Middle tibiæ with a pair of bristles at the basal third, another single one at apical third and a fourth just before the apex, besides an apical spur. Posterior tibiæ with a pair of bristles at basal third and a single one at apical third, besides a long apical spur. Wings slightly but distinctly infuscated, costal vein reaching nearly to the middle of the wing, rather more closely ciliated with moderately long bristles than in *C. atra;* third vein not so arcuate as in that species and less widely separated from the costal;

fourth vein curved at base and straight at apex, meeting the margin just before the apex of the wing; seventh vein distinct, reaching to the border of the wing. Abdomen dull black, not bristly; hypopygium reflexed narrowly at the base, and globular apically, finely hairy below. Legs and halteres black, the femora tinged with piceous.

Described from a single male specimen, collected at Julietta, Idaho, May 3, 1901 (Aldrich).

Conicera atra Meig. (Plate ix, figs. 55, 56.)

1830. Conicera atra Meigen, Syst. Beschr., vi, 226, 1. Pl. lxiii, fig. 13.
1830. Conicera sp. (?) Webster, Insect Life, 2, 356.
1901. Becker, Monog. Phoridæ, p. 81.

Dull black, the palpi and legs often brownish; dorsum of thorax slightly grayish and shortly black hairy, with two dorsocentral and two scutellar bristles; tip of male antenna reaching the vertex, the third joint being about two and one-half times as long as its greatest width. Palpi with rather weak bristles. Fore tibiæ with one bristle below the knee, middle tibiæ with a pair near the base and a third just before the apex, which bears a long spur. Hind tibiæ with a pair of bristles near the base and a third one near the middle, apical spur long. Halteres black; wings hyaline, the costal vein rather strongly ciliated, not reaching to the middle of the wing, tip of first vein almost three-fourths the distance from the humeral to the tip of the costal. Third vein considerably arcuate and distant from the costal for most of its course. Fourth vein uniformly curved, ending as far before the apex of the wing as the fifth vein does behind it. Sixth vein very indistinct at tip, and seventh almost wholly obsolete. Anterior legs usually somewhat yellowish, but this is rather variable.

The female has the third antennal joint shaped as in Phora, but with an apical arista; otherwise it agrees with the male.

Length 1-1.2 mm.

Numerous specimens of this common and widely distributed European species are in the collection, as follows: three males, two females, Washington, D. C. (Coquillett); two males, Horse Neck Beach, Mass. (Hough); two males, Delaware Water Gap, N. J. July 8 (Johnson); one female, Newark, N. J., June 14 (Johnson); one male, Battle Creek, Mich.; two females, Canada (Coquillett); one female, Sullivan Co., N. Y. (Brues).

The North American specimens agree almost perfectly with Becker's description of European ones except that the legs are slightly darker and there is much less variation in the size,—only 1-1.2 mm. instead of 1-2 mm., as given by Becker.

Conicera atra, var. **neotropica,** var. nov.

There is one male in the collection, from Grenada, W. I., which can scarcely represent a different species, but forms a well marked variety. The wings are decidedly brownish and not pure hyaline,

as in *C. atra*, and the third antennal joint of the male falls short of reaching the vertex. The chætotaxy and other characters do not differ, however.

GYMNOPHORA.

Macquart, Histoire Naturelle des Dipteres, ii, 631. Pl. xxiv, fig. 5 (1835).
Schiner, Fauna Austriaca, Diptera, ii, 346 (1864).
Lioy, Atti. Soc. Veneti., 79 (1864).
Osten Sacken, Catalogue North American Dipt., 2nd Edit., 212 (1878).
(Refers to its occurrence in North America.)

"Palpi little protruding, with short hairs, front bare, very wide, last joint of antennæ globular. Feet bare; posterior femor not thickened. Wings not ciliated; marginal nervure bifurcated at its extremity; submarginal arcuated, not attaining the apex of the wing; median nervures sinuous (Pl. 24, fig. 5).

"*Phora arcuata* Meig. differs so much from the others in most of its characters that I have determined to separate it. The name I give to this genus makes allusion to the nudity of the principal organs."—Macquart, *l. c.*, translated.

This easily recognized genus, of which only one species is known, is distinguished, as above indicated, by the absence of setæ on the front, thorax, wings and legs, in fact by almost absolute nudity. In front of the wing are two or three fine hairs, and the vertical bristles of the head are also represented by four weak and short bristles on the vertex, but the apical spines of the tibiæ are absent. Scarcely less characteristic is the course of the fourth longitudinal vein, which curves forward and ends far before the tip of the wing. The third vein reaches considerably past the middle of the wing, and the first ends only a little before the second. The scutellum has only two small bristles, the dorsum of the thorax being bare otherwise. The pulvilli and empodia are present.

Gymnyphora arcuata Meig. (Plate ix, fig. 57.)

1830. Phora arcuata, Meigen, Syst. Beschr, vi, 222. Pl. lxiii, fig. 9.
1835. Gymnophora arcuata, Macquart, Hist. nat. d. Dipt. ii. Pl. xxiv, fig. 5.
1864. Gymnophora arcuata, Schiner, Fauna Austriaca, ii, 346.
1864. Lioy, Atti. Soc. Veneti., p. 79.
1864. Phora debilis, Haliday Entom. Mo. Mag., i, 179.
1878. Gymnophora arcuata, Osten Sacken, Cat. N. Am. Dip., 2d ed., 212.

Head and antennæ black, thorax, including pleuræ the same, abdomen more variable, the middle of the upper surface usually yellowish, venter yellow. Coxæ and feet yellow, posterior femora sometimes a little infuscated. Halteres clear yellow. Wings infuscated along the veins, which are blackish. Hypopygium of

male moderately large, black, with several small chitinous appendages more or less concealed.

Length 1.8 to 3.5 mm., of wing 2–3.7 mm. The smaller measurements belong to the males.

Seventeen specimens; nine from Lawrence, Kans. (a pair taken in copulation, June 2, 1893, measure 1.8 and 3.4 mm.); two from Milwaukee, June 28, '95; one Wisconsin, (Wheeler); one Natrona, Pa., July 12, '95 (Johnson); one Pine Lake, Wisconsin (Wheeler); one Austin, Tex. (Melander); two Woods Hole, Mass. (Brues).

All of these agree perfectly with European specimens determined by Strobl.

Pachyneurella gen. nov.

Head small; front short, twice as wide as long; with three rows of bristles, the two upper ones of four each, the next of only a single bristle at each side, besides two pairs of small proclinate bristles below. Antennæ with a perceptible point at the upper corner where the arista is inserted. Palpi normal, bristly. Tibiæ without setæ, even those at the apex being extremely minute. Third vein of wing not forked, first vein ending less than half way from the humeral to tip of costal; auxiliary vein distinct but short, ending in the first vein as usual, fourth to sixth veins very distinct, about half as heavy as the third vein, with which they appear to effect a direct union, instead of arising as a thin streak parallel to it; seventh vein distinct but lighter. Costal vein reaching to about half the length of the wing, ciliated with fine hairs not bristles. Empodia and pulvilli present, the former pectinated as in the female of *Wandolleckia*. Anal angle of wing without any bristles.

The heavy fourth to sixth vein, simple third vein and absence of tibial spurs are the main characters.

Pachyneurella venata Aldrich. (Plate ix, figs. 58, 59.)

Aldrich, Trans. Lond. Ent. Soc., part iii, 436 (1896) (*Phora venata*).

Male. Head and abdomen black; thorax brownish black; legs, including tarsi yellow; femora a little darker. Palpi brown, antennæ piceous, with strongly pubescent arista. Bristles of front small except on the vertex. Halteres very large, brownish black. Dorsum with one pair of dorsocentral macrochætæ and two pairs of marginal scutellar bristles. Under surface of fore femora with a row of delicate curved hairs. Pleuræ yellowish below. Hypopygium brown, with two black projecting claspers below, of which the left is fixed and the right movable; with a brownish lamella or backwardly projecting portion which is bristly. A yellow band just preceding the hypopygium at the tip of the last abdominal segment.

Length 1.3 mm., of wing 1.1 mm.

One male; St. Vincent, W. I. The type specimen, belonging to the Entomological Society of London.

SYNEURA gen. nov.

Wings with the third vein simple, not bifurcate. Front long, the sides nearly parallel; with three transverse rows of reclinate bristles, besides the four anterior proclinate ones. Antennæ with the second joint slightly oval, more pointed apically, with a dorsal arista. Palpi bristly below. Dorsocentral macrochætæ present. Hind femora thickened; four hind tibiæ each with two long apical spurs, and more or less spinulose along the outer edge. Mediastinal vein indistinct, empodia and pulvilli small but distinct.

This genus comes close to *Metopina* in some respects but is readily distinguished by the oval antennæ, the long spurs on the tibiæ and the different form of the front, the thickened femora, etc. It also resembles *Pachyneurella* but differs by its well developed tibial spurs, much lighter fourth to sixth wing veins, and the normal form of the ovipositor in the female.

The generic diagnosis is based upon *Phora cocciphila* Coq. which is the only described species possessing the above combination of characters. It is quite possible, however, that *Phora exempta* Beck. belongs with *cocciphila* in the present genus. Of this I cannot positively say, as I have not seen the European *exempta*.

Syneura cocciphila Coq.

Cocquillett, Canadian Entomologist, xxvii, 106.

Black, subshining, the under side of the third antennal joint and the palpi yellowish; halteres whitish. Front legs, including the coxæ, light yellow, the others brown. Wings whitish hyaline, costal vein not extending to the middle of the wing, ciliate with very short bristles; apex of first vein near the last fifth of the distance between the humeral cross-vein and the tip of the third vein; fourth vein nearly straight, the cell in front of it nearly twice as wide as the narrowest part of the one behind it. Abdomen bare in both sexes.

Length 75-1.25 mm.

Types. Twenty five specimens in the collection of the Department of Agriculture, bred in October and November, from larvæ infesting dead adults of *Icerya purchasi*, collected by Mr. C. H. T. Townsend at Magdalena, Victoria and Tamaulipas, Mexico.

By the kindness of Dr. L. O. Howard, I am enabled to examine some of the types. I do not know any member of the family in which the first and second veins end so near together. The heavy veins are very short and the light ones relatively long without any marked curves. The thorax is provided with a single pair of dorsocentral macrochætæ and two marginal scutellar bristles.

METOPINA.

Macquart, Hist. Nat. des Dipt., ii. 666 (1835).
Strobl, Funde am Seitenst. (1880) (*Drepanophora*).
Six, Tidschr. voor Entomol., xxi. 126 (1879) (*Leptophora*).
Becker, Monograph Phoridæ, 83 (1901).

Wings with the third vein simple, not bifurcate; front with not more than two transverse rows of four bristles above; lower rows with only two in each row; anterior bristles proclinate. Legs without any bristles or stout hairs, tibial spurs obsolete; femora rather slender. Dorsocentral bristles sometimes absent. Antennæ placed in a deep cavity; spherical, with an apical arista. Eyes more or less hairy. Pulvilli reduced or wanting. Ovipositor of female not heavily chitinized.

This genus, first described by Macquart, was based upon *Phora galeata* Halidy. The type species has recently been described carefully by Mik (Verh. d. kk. Zool-Bot. Ges., 1880). It is represented in North America only by the following species.

Metopina pachycondylæ sp. nov.

Female. Length 2 mm. Black, antennæ and legs yellowish brown. Front black, not shining, almost impunctured, distinctly wider than long, with two rows of transverse bristles, besides the four proclinate ones, and a series of five on each side next to the antennal cavity. Antennæ yellowish; second joint spherical; arista apical, very slightly pubescent. Ocelli very large. Palpi yellow, bristly near the tips only. Cheeks with two forwardly directed bristles. Thorax dull black, finely black pubescent, dorsocentral bristles wanting, scutellum with two marginal bristles. Abdomen blackish or brownish; pleuræ fuscous, varied with yellowish. Coxæ and legs yellowish brown; slender, without bristles and almost bare. Wings clear hyaline, heavy veins fuscous, light ones yellow, third vein ending in a sharp curve before the middle of the wing; costa with very fine and delicate bristles; first vein ending nearly twice as far from the humeral vein as from the tip of the third; fourth vein nearly straight, following veins feebly curved, seventh vein distinct. Halteres yellow.

Described from one of several specimens, reared by Dr. William M. Wheeler at Austin, Texas, in November, 1901. The larvæ live as commensals with the larvæ of the ant *Pachycondyla harpax* Fabr.

This form agrees with Becker's characterization of the genus *Metopina* in most repects and no doubt belongs here. The only great disagreement is in the form of the fifth, sixth and seventh veins in the wing. It agrees in the form of the antennæ, palpi, heavy wing veins, arrangement of frontal setæ and bare legs.

PSYLLOMYIA Loew.

1857. Loew, Wien. Ent. Monatsschr. Figs.
1901. Brues, American Naturalist, 1901, p. 343. Fig.
1901. Wasmann, Zool. Jahrb. Abth. f. Syst., 1901.
1901. Becker, Monograph Phoridæ, 87.

Head swollen, lentiform, completely chitinized. Eyes extremely small, on the sides of the head. Ocelli absent. Antennæ of medium size, arista pubescent. Palpi projecting, not very stout, bristly along the lower edge and at the tip. Proboscis very long, twice as long as the head height and geniculate. Thorax rounded, with bristles along the sides but without any dorsocentral or scutellar bristles. Abdomen and legs as in *Phora*, the latter very bare, only at the tips of the four posterior tibiæ with small short bristles. Wings abbreviated, leathery, resting upon the dorsum of the abdomen, a little longer than the thorax; with indications of three very thick, rib-like longitudinal veins, which are beset with small black bristles, some of which are noticeable because of their much greater length. Halteres almost rudimentary.

This was the first of the genera to be described which has reduced wings in the female sex. It is represented by the single species *P. testacea* Lw. from South Africa. It lives as a guest in the nests of the ant *Dorylus*.

COMMOPTERA Brues.

Brues, American Naturalist, 1901, p. 344.

Female. Small and rather stout species with reduced wings. Head with very large but rather shallow antennal cavities. Eyes small, about half as large as in *Phora;* ocelli absent. Antennæ rounded, a little pointed at the tip where an apical arista is inserted. Front short and broad, anterior frontal bristles porrect; besides these the front has only a single ocellar row of four bristles. Thorax about square; scutellum present, with two bristles, dorsocentrals wanting. Wings short, less than twice as long as the thorax, with long costal bristles; costa reaching to wing tip, where it meets the simple third vein. Abdomen entirely membranous except for four small dorsal plates, the last of which contains the opening of a gland. Legs moderate.

The only described species of this genus occurs in Texas in the nests of the common "Fire Ant," *Solenopsis geminata* Fabr.

The male sex is unknown.

Commoptera solenopsidis Brues.

Brues, American Naturalist, 1901, 344.

Female. Length 1.5 mm. Pale yellow, head somewhat darker, and abdomen a little lighter.

PLATYPHORA Verrall.

Verrall, Journal Linn. Soc., vol. xiii, 1877, p. 259.
Becker, Monog. Phoridæ, p. 88.

Body broad and much flattened, without any macrochætæ. Thorax transverse, abdomen small, third vein simple, costa weakly ciliated at the base.

Broad, flat, shining, frons very broad, the eyes scarcely occupying one sixth the width of the head. Antennæ with the third joint rather large, somewhat rounded. Thorax broad, flat, rather broader than the head. Scutellum margined, nearly four times as wide as long. Abdomen narrower and shorter than the thorax. Legs stoutish, middle tibiæ with two small spines at the tip. First vein ending just before the third which is not furcate.

(Condensed from the original description.)

This genus is represented by a single species, *P. lubbocki* Verrall, from England. As has been pointed out by Verrall, it is readily separated from all the other known genera of the family by the lack of bristles on the body, simple third vein and greatly flattened body. It has been suggested that this may be the male sex of the genus *Ænigmatias* Mien., of which only the wingless female has been described. This is only a supposition, however.

ÆNIGMATIAS Meinert.

Meinert, Entom. Meddel, 1890.
Becker, Monog. Phoridæ, 1901.
Brues, Amer. Naturalist, 1901.
Coquillett, Canad. Entom., Jan. 1903.

Head large and free. Antennæ and mouthparts of the usual type. Thorax not divided, first segment of the abdomen fused with the second; the following segments free, imbricate. Wings and halteres absent. Abdomen composed of four or five free segments. Legs slender, claws delicate as in other Phoridæ. Antennæ short, spherical, with a very long bare arista, which is obscurely two-jointed at the base. Palpi slightly clavate, bristly. Proboscis very small, the labellæ not distinct. Anterior femora very large, posterior ones conical. Abdomen compressed, brown or fusco-piceous, covered

with small hairs arranged in transverse rows, largest at the edges of the segments.

Only the wingless female of this genus is known, represented by the type species *Æ. blattoides* Mein., from Denmark, and by *Æ. schwartzii* Coq., from Arizona in this country.

Table of Species.

Abdomen with four free segments ..... **schwartzii** Coq.
Abdomen with five free segments ..... **blattoides** Mein.

Ænigmatias schwartzii Coq.

Coquillett, Canadian Entomologist, xxv, 20.

Dark yellow, the posterior part of the body segments brown, most extended on the apical part of the abdomen, where it covers the genitalia and the greater portion of the last two segments; upper side of body opaque, distinctly whitish-pruinose, and with a short, sparse, yellowish-white pubescence, a row of short black bristles along the hind margin of each abdominal segment and a few shorter ones scattered over the last two segments; first thoracic segment (which comprises the prothorax and mesothorax) slightly over twice as long as the second, the latter almost twice as long as the first abdominal segment and subequal to the second, about two-thirds as long as the third, the fourth segment deeply emarginate in the middle, at which point it is slightly shorter than the first abdominal segment; greatest vertical diameter of abdomen scarcely more than that of the thorax, venter convex (and without the blackish protuberance shown in Dr. Meinert's figure 2); head sparsely clothed with a short, yellowish-white pubescence, a row of black post-ocular bristles extends from the upper end of each eye to the oral margin, apices of palpi beset with a dense cluster of black bristles; legs beset with short, black, bristly hairs, femora very robust.

Length 1.5 mm.

Type locality, Flagstaff, Arizona. Type No. 6703, U. S. National Museum.

In regard to its habits, Mr. Coquillett gives the following note: "Of its habits nothing is known beyond the fact that it occurred on low vegetation in a locality where no ant-nests could be found, although search was made for them. No stones or rocks occurred in the immediate vicinity, the nearest approach being the small pieces of lava scattered about, but these were too small to conceal an ant-nest."

ECITOMYIA Brues.

1901. Brues, American Naturalist, p. 347.

Male. Small, rather slender species. Head with large antennal cavities; antennæ with spherical third joint and apical arista; anterior frontal bristles porrect. Front broader than long, with three

transverse rows besides the four anterior bristles. Proboscis much shorter than the head; palpi bristly. Thorax with one pair of dorsocentral macrochætæ and two marginal scutellar bristles. Wings large, with only a single heavy vein (the third) which is simple at the tip. Costa with fine setæ; reaching to the middle of the wing. Three lighter veins present, the seventh being absent. Legs long and slender, with no longer bristles.

Female. Eyes reduced in size, no larger than the antennæ; ocelli absent. Thoracic dorsum in one piece, the scutellum being absent; with a single pair of dorsocentral bristles. Wings short, finely hairy and reduced to finger shaped appendages which are no longer than the mesonotum. Dorsal abdominal plates reduced, the rest of the abdomen membranous. At the base is a large trapezoidal plate (second segment), followed by three smaller ones of which the last contains the opening of the gland. Legs stouter than in the male, with no bristles except very delicate spurs on the four posterior tibiæ.

This singular genus is represented by only one species, *E. wheeleri* Brues, from Texas. It lives in the nest of the blind driver ant, *Eciton cœcum* Latr.

Ecitomyia wheeleri Brues.

American Naturalist, May, 1901, p. 347. Figs.

Male. Length .68 mm. Alutaceous, thorax infuscated above. Abdomen piceous on basal three-fourths above, except on the anterior margins of the segments, where it is much paler. Antennæ, palpi, face and legs pale testaceous anterior tibiæ black except at extreme base; hypopygium more or less black, Wings hyaline, veins pale. Costa with very small bristles. The three lighter discal veins almost straight.

Female. Length 1.20 mm. Head and thorax yellowish brown, much darkened above. Abdomen yellowish white, its small dorsal plates darker, the first almost piceous. Legs yellowish.

ACONTISTOPTERA Brues.

Brues, American Naturalist, xxxvi, 373 (1902).

Head very broad, more than one and one half times as wide as thorax, widest at the front angles; half as long as wide; seen from above regularly arcuate in front, concave behind; front angles sharp, hind ones broadly rounded. Upper surface of head with a small median pair of macrochætæ, eight marginal ones on lateral and posterior edges, one over each eye, a bunch at front angles and a regular series of closely placed ones along the front between the antennæ. Front prolonged over the deep antennal cavity. Thorax small,

greatly narrowed behind; the sides slightly sinuate and the pleuræ partially visible from above owing to the narrowness of the dorsum. Dorsum with a pair of macrochætæ at the anterior angles and a shorter pair posterior to these; also a pair of anterior discal and two pairs of dorsocentral ones. Scutellum very small, with two bristles. Legs rather slender, especially the tarsi, spurs of four posterior tibiæ well developed. Wings short, about the length of the thorax, arcuate. At about the middle the costal bristles suddenly enlarge to form enormous macrochætæ, some of which are more than twice as long as the wing. Abdomen without any indications of segments or sclerites, except the fifth which is small with two macrochætæ and a chitinous ring extending from its posterior edges.

Acontistoptera melanderi Brues.

1902. Brues, American Naturalist, xxxvi, 374, figs. 4, 5.

Female.—Length 1 mm., of longest wing bristle .4 mm. Light yellow, head darker, fuscous in places, the occiput irregularly lighter, a small yellow circular spot at the insertion of all the macrochætæ. Antennæ, palpi and lower part of the head yellowish white. Thorax but little lighter than the head; wings almost white, their bristles black and very conspicuous, about ten in number. Legs finely black hairy, more deeply colored distally.

Eleven specimens, all from Austin, Texas, March 24th and December 6-7, 1901, in nests of the ant *Eciton opacithorax* Emery.

XANIONOTUM Brues.

1902. Brues, American Naturalist, xxxvi, p. 376, figs. 6, 7.

Head broad, one and one half times as wide as the dorsum of the thorax; rounded triangular in shape; twice as wide as long when seen from above. Four macrochætæ on the middle of the front, one on each side half way toward the eye, another just in front of eye, one at posterior angle, a pair of median marginal, and two widely separated discal ones. Antennæ attached at the lower part of their unusually shallow cavities. Ocelli absent. Eyes very small. Cheeks bristly; proboscis nearly as long as head height. Thorax rounded, rather suddenly narrowed behind, much narrower than the head and slightly wider than long. Scutellum very small, without bristles at the anterior angles and with one pair of dorsocentral ones. Legs slender, the tarsi long, tibial spurs of four posterior tarsi well developed. Wings nearly as long as width of thorax, band-shaped and widened at apex, very strongly bristly, the costal bristles longer than the wing. Abdomen with the small dorsal plate of only the fifth seg

ment visible. Gland opening on fifth segment small, with its margin hardly at all thickened; posterior margin of second to fifth segments marked off by wide rows of enormous macrochætæ which extend more than half way across the abdomen. Sexual organs smaller than usual.

This peculiar genus, which is known only in the female sex, is represented by a single species.

Xanionotum hystrix Brues.

Female.—Length 1.25 mm. Light yellow, almost white, the head much darker above, except an irregular yellowish spot on the vertex, all the large macrochætæ fuscous. Wings with about eleven of the large macrochætæ and each abdominal band consisting of about twenty bristles. Thorax tinged with darker above, especially in front. Legs concolorous with the body, tarsi darker yellow, legs finely black hairy, without stout bristles except one spur each on the tibiæ.

Two specimens, Austin, Texas, March 24, 1901, in nests of the ant *Eciton opacithorax* Em., also another female from the same locality in a nest of *Eciton Schmitti*, May, 1902.

PULICIPHORA Dahl.

1897. Dahl, Zool. Anz., xx, p. 410.
1898. Dahl, Situngsberichte d. Naturf. Freunde., p. 185.
1898. Dahl, Zool. Anz., xxi, p. 308.
1898. Wandolleck (*Stethopathus*), Zool. Jahrb. Abth. f. Syst., p. 424.
1901. Brues (*Stethopathus*), American Naturalist, May, p. 354.
1903. Melander and Brues (*Stethopathus*), Biological Bulletin, June.

Male. Front with four bristles in an upper row and 2–4 more anterior bristles. Third antennal joint rounded, arista apical. Mediastinal vein distinct; third longitudinal vein simple, not forked; four light wing veins present. Legs long and slender with no bristles except the spurs on the posterior tibiæ. Pulvilli and empodium wanting. No bristles on the posterior wing margin at the base.

Female. Both wings and halteries absent, eyes much reduced, ocelli present. Thorax small, rounded when seen from the side, transverse when seen from above, twice or three times as wide as long. Abdomen elliptical first four dorsal segments strongly chitinized, covering the greater part of the dorsum of the abdomen. Legs stouter than in the male.

Represented by three species, two from the Bismarck Archipelago, and one from the eastern part of the United States.

Puliciphora occidentalis M. et B.

1903. Melander and Brues, Biol. Bull., v, 17 (*Stethopathus*).

Female.—Length 75 mm. Head rounded triangular, about two-thirds as long as wide, vertex descending rather steeply and evenly. Eyes small, ocelli present. Proboscis long and stout, equal to the head height; palpi small and slender, clavate, with stout macrochætæ. Head with four closely approximated macrochætæ at the middle of the front margin, two widely separated ones near the anterior corner of the eye, and two near the posterior angles of the head; a series of small macrochætæ below and in front of the eye. Thorax small, twice as wide as long, truncate before and behind. Dorsum with a pair of long macrochætæ just behind the humeri and four smaller marginal ones along the posterior edge. Abdomen considerably swollen, but with large and strongly chitinized dorsal plates; the first is only a narrow band, contiguous with the second which is very large and contiguous with the third; fourth and fifth separated by white membrane. Seen from above the abdomen is twice as wide as the thorax and flattened oval in cross section. Glandular opening of the fifth segment in the shape of an arcuate slit. Legs rather stout, the tibiæ with two apical spurs. Testaceous, head and thorax darker above, especially directly above ocelli. Abdominal plates dark fuscous, the membranous parts almost white, with a small fuscous spot at the insertion of each hair.

Type locality, Wood's Hole, Mass.

I have seen only the three type specimens.

CHONOCEPHALUS Wand.

1897. Dahl (female of *Puliciphora*), Zool. Anz., xx, 409.
1898. Wandalleck, Zool. Jahrb. Abth. f. Syst. (1898).
1901. Becker, Monog. Phoridæ, p. 86.
1901. Brues, American Naturalist, May, p. 355.

Male. Antennæ in deep cavities, with an apical arista. Front with bristles only along the side margins. Wings very hairy. Costal vein extending past the middle of the wing, with very short bristles. Third longitudinal vein simple, mediastinal and humeral cross vein wanting. Four light wing veins present, the sixth vein with a sigmoid curvature near the base. Legs slender, not bristly except for weak spurs on the posterior tibiæ. Pulvilli and empodium absent.

Female. Head with very small eyes and no ocelli, thorax small, wider than the head but extremely short. Abdomen elliptical, with six strongly chitinized dorsal plates which extend far down on the sides. Sixth ventral plate also present, almost meeting the sixth dorsal.

This genus is known to occur only in the Bismarck Archipelago, where it is represented by a single species, *C. dorsalis* Wand.

WANDOLLECKIA Cook.

1897. Cook, Science, vi, 886.
1898. Wandolleck (Cook'sche Gattung), Zool. Jahrb. Abth. f. Syst., 417.
1901. Becker, Monog. Phoridæ, 87.
1901. Brues, American Naturalist, xxv, 339.

Related to *Chonocephalus* Wand. Male winged; female entirely without wings or halteres. Female with very small eyes and no ocelli; thorax small; abdomen with seven segments. Third antennal joint spherical, with an apical arista. Pulvilli pectinated, empodia setiform.

This genus is represented by a single species from West Africa, found upon land snails belonging to the genus *Achatina*. The species has never received a name, and I, therefore, designate it as *W. cooki*, in honor of its discoverer Dr. O. F. Cook.

GENERA OF UNCERTAIN POSITION.

Under this head I have attempted to group all of the genera which have been too poorly characterized to admit of recognition, or which, for the various reasons set forth under each, will have to be ignored.

ANEURINA Lioy.

1864. Lioy Atti, Soc. Veneti., 77.

"Face often with an impressed line. Frontal macrochætæ directed downwards; legs setulose, posterior tibiæ usually very spinose. Wings slightly ciliated on the margin; marginal vein bifurcate at the apex, submarginal reaching to the apex of the wing, arcuate at the base and straight at the extremity; anal vein wanting, median nervure straight."

"The name refers to the absence of the anal vein."

Type, *A. urbana* Meig.

According to Becker, *P. urbana* Meig. possesses four discal veins and the frontal bristles are all reclinate. If such be the case, *Aneurina* cannot be retained as a valid genus, which would be of doubtful propriety, anyhow, even if the diagnosis were correct. This must evidently have been based upon wrongly determined specimens.

OBELOSIA Lioy.

1864. Lioy Atti, Soc. Veneti., 77.

"Macrochætæ of the front directed downwards, posterior tibiæ with small spines, intermediate ones bare, with a long terminal spine. Wings ciliated with the marginal vein bifurcate at the ex-

tremity; submarginal reaching the apex of the wing, arcuate at the base straight at the apex. Median nervure straight."

"The name refers to the long spur of the intermediate tibiæ."

Type, *O. rufipennis* Macq.

This genus was based upon an unrecognized species of Macquart, otherwise the diagnosis would apply tolerably well to Aphiochæta (as would also his *Trisometopia*). It seems unwise, however, to resurrect this old name, which is without significance, resting as it does upon an unrecognizable species; and to modify the diagnosis to suit a large group of species since described. This would also involve choosing a new type species for the genus. For this reason I think it had best be discarded.

DIPLONEURA Lioy.

1864. Lioy Atti, Soc. Veneti., 77.

"Frontal macrochætæ directed downwards, palpi usually broad; legs setulose, tibia often almost bare; wings with the margin ciliated strongly. Marginal vein bifurcate at the extremity, submarginal reaching to the apex of the wing, arcuate both at the base and apex; median nervure straight."

"The name refers to the furcate marginal vein."

"Types *D. nitidula* Meig., *D. florea* Meig., *D. atra* Macq."

Of the types chosen for this genus, the first cannot be recognized, and the type of the species does not seem to be extant (Becker, '01, 71). The second belongs to *Phora*, having all the frontal bristles reclinate, and the last, *atra* Macq., is unrecognizable. Hence the generic name can only be a burden, and had best be dropped.

LISSOMETOPIA Lioy.

1864. Lioy Atti, Soc. Veneti., 79.

"Front bare, without macrochætæ, legs setulose. Wings ciliated only at the base; marginal vein simple, reaching beyond the middle of the wing, submarginal reaching to the apex of the wing; median nervure straight."

"The name refers to the bare front."

"Type, *L. nudifrons* Macq."

This genus is based upon an unrecognizable species described by Macquart, and as the characters do not apply in their entirety to any present known species or group, it will have to be discarded,

tentatively at least. It resembles *Gymnophora* in the partial absence of the costal bristles but differs by its setulose legs. Possibly if the type species is ever identified, it may be possible to determine the validity of the genus.

It is quite possible that *Platyphora* Verrall may be a synonym of *Lissometopia*, as these two genera are the only ones known to me in which the front is not at all bristly. If this be so then *Lissometopia* has priority over *Platyphora*.

NEMOSIA Lioy.

1864. Lioy Atti, Soc. Veneti., 78.

"Frontal macrochætæ directed downwards; vertex with a transverse tubercle, anterior tibiæ with two or four lateral bristles, intermediate ones not ciliated; posterior ones with a lateral bristle. Wings ciliated, with the marginal nervure simple, extending beyond the middle of the wing. Submarginal reaching to the apex of the wing. Median nervure straight."

"The name refers to the occurrence of these insects in forests."

Type, *N. incrassata* Meig.

The generic diagnosis contradicts the descriptions of Meigen and others (see Becker, '01, p. 38) of the species chosen as type, as regards the chætotaxy of the middle tibiæ. As such is the case, the generic name can hardly be applied with propriety to the group which happens to agree with a diagnosis drawn up from an incorrectly determined species as type, and will have to be discarded.*

HIERONYMUS Weyenbergh.

1886. Weyenbrgh, Tidschr. Ent., xxix.

Antennæ small, placed low down, almost on the border of the mouth. Proboscis arcuate, strongly hairy, palpi small. Thorax strongly arched and more or less concealing the head. Legs with only short bristles; femora long and slender; tibiæ broad, each with two apical spurs and with bristles. Wings very long and wide; costal vein with short bristles, mediastinal vein not very distinct.

Important characters, translated from Wyenbergh's generic diagnosis.

From the above it is impossible to tell the generic relations of this

* The species designated belongs to *Phora*, and the description applies in its entirety neither to the type species nor to any known group.

form, which is represented by a single species, *H. pygmæus* Wyenb., from Cordova, South America. It is, therefore, omitted from the table of the genera.

PALLURA Walker.

1859. Walker, Journal Proceed. Lin. Soc., iii, 127.

Male. Body rather broad, pubescent. Proboscis rather small, withdrawn; antennæ very short, arista very long; scutellum large, conical, extending beyond the base of the abdomen. Abdomen nearly elliptical, no longer than the thorax; legs rather broad, pubescent, without bristles; wings rather long and broad; veins of equal size, costal vein ending at rather before half the length of the wing, cubital ending at hardly in front of the tip, præbrachial ending at a little behind the tip, probrachial ending on the hind border at half the length of the wing; discal transverse vein straight, parted by more than twice its length from the border and from the præbrachial transverse.

This description is worthless as it contains no unique character and omits many of the necessary ones for distinguishing the well known genera. As Becker (1901, 90) has already remarked, it is hard to see what Walker had in mind as distinguishing characters for the genus.

TERMITOXENIA Wasmann.

1900. Wasmann, Zeit. Wiss. Zool., lxvii, 4 Heft, pp. 599-617. Plates.
1901. Wasmann, *ibid.*, lxx, 2 Heft, pp. 289 298.

When Wasmann first described this genus (*l. c.*, 1900), he regarded it as related to the forms of wingless Phoridæ for which Wandolleck had just previously erected the family Stethopathidæ and accordingly placed it in this latter family, giving numerous reasons which seemed to justify such a conclusion.

Later, however, at Mik's suggestion, in a second paper (*l. c.*, 1901), Wassmann attempted to remove it entirely from its position near the Phoridæ and assign to it a place near the Muscidæ; not in the Eumyidæ as Mik suggested, but in a position intermediate between the Muscidæ and the *Pupipara* in the family Termitoxeniidæ. All of the very close similarities which Dahl had pointed out between *Termitoxenia* and the Phoridæ were cast aside as merely "wichtige Aenlichkeiten," while the post embryonic development, which has been only slightly studied, and the shape and position of the antennal cavity were chosen to determine its position. It is so well known as

to scarcely need mention that the post-embryonic devèvelopment is not a good character to separate groups, while the shape and position of the antennal cavity are characters which appear in such an endless combination that we are always open to error in attempting an artificial division of groups on such a character.

In my opinion the peculiar antennæ of *Termitoxenia* are enough to prove without a doubt its close relationship to the Phoridæ. The Phoridæ are absolutely unique among the Diptera by the structure of the antennæ which have the second joint enclosed in the third. *Termitoxenia* has exactly similar antennæ, both in shape and structure. We must then consider the two closely related or believe that the similarity is purely accidental, which is scarcely possible. The comb-like rows of bristles upon the metatarsi of *Termitoxenia* are also exactly similar to those of many Phoridæ, in which family the tibiæ and tarsi show a great tendency to bear such rows of hairs. I know of no other Diptera which possess these. Then the shape of the thorax, the form of the legs, with the long free anterior coxæ, the reduction of the wings and the eyes, the swollen abdomen, with a very small first and extremely large second segment, all find their counterparts among certain Phoridæ. The probosis has no doubt been greatly modified to conform with its termitophilous habits.

For these reasons I have included *Termitoxenia* in the present paper. While it may represent a distint family, it is evidently closer to the Phoridæ than to any other Diptera.

CATALOGUE OF SPECIES.

As many of the generic names used in the present paper are new and necessitate a different arrangement of the species, I have prepared the following catalogue in which the species are segregated in their proper genera. North American species are in the larger type, others in the smaller.

PHORA Latr.

pachyneura Loew, Centuries, vii, 97 (1866).
fratercula sp. nov.
thoracia Meig., Class i, 313, 2.
microcephala Loew, Centuries, vii, 96.
spinipes Coq., Canad. Ent., xxvii, 105.
olympiæ sp. nov.
scutellatas sp. nov.
multiseriata sp. nov.
venusta Coq., Canad. Ent., xxvii, 105 (1895).

comstocki sp. nov.
luggeri Ald., Canad. Ent., xxiv, 125 (1892).
nitidifrons sp. nov.
cimbicis Aldrich, Canadian Entomologist, xxiv, 143.
incisuralis Lw., Centuries, vii, 98.
divaricata Ald., Trans. Ent. Soc., London, 1896, pt. iii, 437.
var. **perplexa** var nov.
grœnlandica Lundbeck., Særtryk of Vidensk. Med. fra den Naturh. Foren. i, Kjobenhavn, 1900.
palposa Zett., Dipt. Scand., vii, 2870, 20.
opaca Meig., Beschr., vi, 211.
nigricornis Egg., Verhandl. d. k. k. Zool-bot. Ges., xii, 1235.
lugubris Syst., Beschr., vi, 217, 17.
trinervis Becker, Monog. Phoridæ, 19.
urbana Meig., Syst. Beschar., vi, 215, 11.
fennica Becker, Monog. Phoridæ, 22.
abbreviata v. Roser., Wuertemb. Correspondenzblatt, 1840, 64.
crassicornis Meig., Syst. Beschr., vi, 215, 11.
concinna Meig., Syst. Beschr., vi, 220, 26.
bergenstammi Mik., Verh. d. k. k. Zool-bot., Gesellschaft, 1864, 793.
maculata Meig., Syst. Beschr., vi, 214, 7.
bohemanni Becker, Monog. Phor., p. 27.
spinosissima Strobl, Phoriden Oesterreichs, 162.
excisa Becker, Monog. Phor., 28.
nudipalpis Becker, Monog. Phor., 29.
unispinosa Zett., Dipt. Scand., xiv, 6475.
dorsalis Becker, Monog. Phoridæ, 31.
chlorogastra Becker, Monog. Phoridæ, 32.
unicalcarata Becker, Monog. Phoridæ, 32.
erythronota Strobl, Phoriden Oesterreichs, 195, 6.
curvinervis Becker, Monog. Phoridæ, 33.
aptina Schiner, Fauna d. Adelsb. Grotte. (1863).
abdominalis Fall., Dipt. Suec., Phytomyzides, 5, 2.
strobli Becker, Monog. Phoridæ, 36.
autumnalis Becker, Monog. Phoridæ, 44.
sorocula v. d. Wulp, Tidschr. v. Entomol., xiv, 209.
sinensis Schiner, Novara Reise Dipt., 224, (1868).

DORNIPHORA Dahl.

dorhni Dahl., S. B. d. naturf. Freunde, 1898, p. 188.

HYPOCERA Lioy.

johnsoni sp. nov.
ehrmanni sp. nov.
femorata Meig., Syst. Beschr., vi, 213, 5.
clavata Lw., Centries, vii, 95.
mordellaria Fall., Dipt. Suec. Phytomyzides, 6, 4.
grenadensis sp. nov.

incrassata Meig., Syst. Beschr., vi, 212, 1.
bernuthi Egg., Verh. d. k. k. Zool-bot. Ges., 1862, 1234.
carinifrons Zett., Dipt. Scand., vii, 2885, 33.
coronata Becker, Monog. Phoridæ, 41.
agilis Meig., Syst. Beschr., vi. 215, 5.
citreiformis Becker, Monog. Phoridæ, 43.
vitripennis Meig., Syst. Beschr., vi, 223, 36.

APHIOCHÆTA gen. nov.

epeiræ Brues, Psyche, 1902, 351.
pygmæa Zett., Dipt. Scand., vii, 2860.
fasciata Fall., Dipt. Suec. Phytomyzides, 7. 9.
obscura sp. nov.
picta Lehm.. Hamb. Observ., 1822 43.
flava Fall., Dipt. Scand. Phytomyzides, 7. 6.
atlantica sp nov.
lutea Meig., Syst. Beschr., vi, 220.
fungicola Coq., Canad. Ent., xxvii, 106.
nigriceps Lw., Centuries, vii, 99.
scalaris Lw., Centuries, vii, 100.
aurea Ald., Trans. Ent. Soc., London, 1896, 437.
magnipalpis Ald., *l. c.*, 438.
giraudii Egg., Verh. d. k. k. Zool-bot. Ges., 1862, 1235.
halictorum M. et B., Biological Bulletin, June, 1903.
minuta Ald., Canad. Ent., xxiv, 146.
furtiva Ald., Trans. Ent. Soc., London, 1896, 436.
rufipes Meig., Class i, 313, 3.
albidohalteris Felt., 12th N. Y. Report. 228.
agarici Litner, 10th Rept. N. Y. Entomologist, 399.
setacea Ald., Canad. Ent., xxiv, 146.
rostrata M. et B., Biological Bulletin, June, 1903.
pulicaria Fall., Dipt. Suec. Phytonizides, 7, 6.
cata M. et B., Biological Bulletin, June, 1903.
costalis v. Roser, Wurtemb. Correspondenzblatt, 1840, 64.
meigeni Becker, Monog. Phoridæ, 53.
melanocephala v. Roser, Wurtemb. Correspondenzblatt, 1840, 64.
cubitalis Becker, Monog. Phoridæ, 56.
projecta Becker, *l. c.*, 56.
ruficornis Meig., Syst. Beschr., vi, 218, 21.
zonata Zett., Ins. Lapp., 796, 6.
sordida Zett., *l. c.*, 796, 5.
humeralis Zett., *l. c.*, 796, 7.
pusilla Meig., Syst. Beschr.. vi, 218, 19.
minor Zett., Scand., vii, 2864, 13.
ciliata Zett., *l. c.*, vii, 2872, 22.
xanthozona Strobl., Phoriden Oesterreichs (1893), 203, 27.
paulmeni Becker, Monog. Phoridæ, 65.
umbrimargo Becker, *l. c.*, 65.
nudipes Becker, *l. c.*, 66.

dahli Becker, *l. c.*, 67.
latifemorata Becker, *l. c.*, 67.
posticata Strobl., Wiss. Mitth. Bosnien, vii, 646.
(?) *orientalis* Schiner, Novara Reise Dipt., 224.

APOCEPHALUS Coquillett.

pergandei Coq., Proc. Ent. Soc., Washington, iv.
wheeleri sp. nov.

MELALONCHA.

pulchella sp. nov.
stylata Schiner, Navara Reise Diptera, 224 (1868).
? *formicarum* Verrall, Jour. Linn. Soc., xiii, 258.

TRINEURA Meig.

aterrima Fabr., Ent. Syst., iv, 334.
velutina Meig., Syst. Beschr., vi, 224.
montana sp. nov.
schineri Beck, Monog. Phoridæ, 80.

CONICERA Meig.

atra Meig., Syst. Beschr., vi, 226, 1.
var. netropica var. nov.
idahoënsis sp. nov.
similis Haliday, Entom. Monthly Mag., i, 1833, 179.

GYMNOPHORA Macquart.

arcuata Meig., Syst. Beschr., vi, 222.

PACHYNEURELLA gen. nov.

venata Aldrich, Trans. Ent. Soc., Lond. 1896, 436.

SYNEURA gen. nov.

coccipbila Coq., Cand. Ent., xxvii. 106.
? *exempta* Becker, Monog. Phoridæ, 49.

METOPINA Macquart.

pachycondylæ sp. nov.
galeata Haliday, Ent. Mag., i, 179.

PSYLLOMYIA Lw.

testacea Loew, Wien. Ent. Montsschr, 1857, 54.

COMMOPTERA Brues.

solenopsidis Brues, Amer. Naturalist, May, 1901.

PLATYPHORA Verrall.

lubbocki Verrall, Journal Linn. Soc., xiii, 259.

ÆNIGMATIAS Meinert.

schwartzii Coq., Canad. Ent., xxxv, 20
blattoides Meinert, Entom. Meddel., 1890.

ECITOMYIA Brues.

wheeleri Brues, Amer. Nat., 1901. 347.

ACONTISTOPTERA Brues.

melanderi Brues, Am. Nat., 1902, 373.

XANIONOTUM Brues.

hystrix Brues, Am. Nat., 1902, 377.

PULICIPHORA Dahl.

occidentalis M. et B., Biological Bulletin, June, 1903.
lucifera Dahl., Zool. Anz., 1897. 410.
pulex Dahl., SB. der Naturf. Freunde, 1898, 186.

CHONOCEPHALUS Wandollek.

dorsalis Wand., Zool. Jahrb. Abth. f. Syst., xi, 428.

WANDOLLECKIA Cook.

cooki nom. nov.

PALLURA Walker.

incaria Walker, Jour. Linn. Soc., iii, 127 (1859).

HIERONYMUS Wyenbergh.

pygmæus Weyenbergh, Tidschr. Ent., xxix.

TERMITOXENIA Wasmann.

Subgenus **TERMITOXENIA** Wasm.

havilandi Wasm., Zeit. Wiss. Zool., lxvii, 609.
heimi Wasm., *l. c.*, p. 610.
assmuthi Wasm. Zool. Jahrb. Abth. f. Syst., Bd. xvii, Heft i, p. 161.

Subgenus **TERMITOMYIA** Wasm.

braunsi Wasm. Zeit. Wiss. Zool., lxvii, 611.
mirabilis Wasm., *l. c.*, p. 610.

BIBLIOGRAPHY.

In this list I have endeavored to give papers relating to the habits, morphology and relationships of the Phoridæ, as well as the more comprehensive papers referring to the classification of American species.

1892. ALDRICH, J. M.—Canadian Entomologist, XXIV. (Describes four new species.)

1896. ALDRICH, J. M.—A collection of Diptera from Indiana Caves. Rept. Geol. Indiana, xxi, 1896, 190.

1896*a*. ALDRICH, J. M.—Diptera of St. Vincent, part on Phoridæ. Trans. Ent. Soc., Lond. 1896.

1901. BECKER, T.—Die Phoriden. Abh. Zool. Bot. Ges. Wien. pp. 100. A monograph of the European species and the genera of world.

1901. BRUES, C. T.—Two New Myrmecophilous Genera of Aberrant Phoridæ from Texas. Am. Nat. XXXV, 337-356.

1896. DAHL, F.—Vergleichende Untersuchungen über die Lebensweise wirbelloser Aasfresser. Mitth. Ak. Wien., 1896, 11-24.

1896. DAHL, F.—Sitzb. Ges. naturf. Freunde Berlin, 1898, 186, *et seq.* (Discusses the relation of the Phoridæ to *Scatopse* and Sipho naptera).

1899. DAHL, F.—Die Stellung der Puliciden im System. Arch f. Naturgesch., LXV, 71-86.

1866. LOEW, H.—Diptera Americæ Septentrionalis indigena. Berliner Ent. Zeit., 1866. (Describes six North American species).

1888. MEGNIN, P.—La Faune des Tombeau. Rev. Sci. Bourb., i, 281.

1900. MIEJERE., J. H. C. DE.—Ueber die Larve von Lonchoptera. Ein Beitrag zur Kenntniss der cyclorrhaphen Dipternlarven. Zool. Jahrb. Abth. f. Syst., xiv, 87-132. Pls. 2.

1880. OSTEN SACKEN, C. R. VON.—American Entomologist, III, 1880. (Refers to habits of *Phora*.)

1902. OSTEN SACKEN, C. R. VON.—The Position of *Phora* in the System of Diptera. Entom. Mag. Ser. II, xiii, 204.

1868. PACKARD, A. S., JR.—Am. Nat., II, 196.

1888. PACKARD, A. S., JR.—The Cave Fauna of North America. Mem. Nat. Acad. Sci., iv, pp. 1-156.

1901. PERGANDE, T.—The Ant-decapitating Fly. Proc. Ent. Soc. Wash. (Describes the habits of *Apocephalus pergandei*.)

1885. RILEY, C. V.—Fourth Report U. S. Ent. Commission, 116. (Disscusses habits of *Phora aletiæ* = *P. microcephala* Lw.) with figures of metamorphoses.

1864. SCHINER, J. R.—Fauna Austriaca, Diptera, ii.

1886. SCUDDER, S. H.—Bull. U. S. Geol. Survey, Nos. 31, 86. (Eleven Amber species by Loew.)

1896. WANDOLLECK, B.—Die Stethopathidæ, eine neue, fluegel- und schwingerlose Familie der Diptera. Zool. Jahrb, Abth. f. Syst., XI, 412.

1900. WASMANN, E.—Termitoxenia, ein neues fluegelloses physogastres Dipterengenus aus Termittennestern. I Theil. Aeussere Morphologie und Biologie. Zeit. Wiss. Zool., LXVII, 599.

1901. WASMANN, E.—*Ibid.* II Theil. Nachtrag zum systematischen und biologischen Theil. Zeit. Wiss. Zool. LXX, 289.

1902. WASMANN, E.—Zur næheren Kenntniss der termitophilen Dipterengattung Termitoxenia. Verh. d. Vten. Internationalen Zoologencongresses zu Berlin, 1901.

1890. WEBSTER.—Notes on Species of Necrophagous Diptera, Insect Life, II, 356.

1901. WHEELER, WM. M.—An Extraordinary Ant guest. Am. Nat., xxxv, 1007.

APPENDIX.

NOTE 1.—Regarding the use of the generic terms *Phora* and *Trineura*, Prof. Aldrich, with the assistance of Dr. Henshaw, has looked up the matter carefully and come to the following conclusion.

The genus *Phora* was first mentioned by Latreille (Hist. Nat. Crust. et Ins., iii, 464 (1802), where after a brief description of the genus *Phora*, then adds the following: "Exemple. Musca aterrima; putris? F." The *putris* is probably *Themira putris*, but as it is put second and with a query does not affect the real type which is clearly *aterrima*.

Meigen established the genus *Trineura* in 1803 in Illiger's Magazine, one year after Latreille's characterization of *Phora*, with the

same species as type, namely *aterrima*. Seeing, therefore, that *Trineura* was a synonym of *Phora*, some years later (Syst. Beschr., vi, 212), Meigen distinctly says that his *Trineura* is a synonym of *Phora*, which has precedence; it is on this account that he puts all the species under *Phora*, dropping *Trineura* entirely.

From these facts it can be seen that a strict application of the rule of priority would necessitate the removal of *Trineura*. As it would cause needless confusion, however, to restore *Phora* to its proper position at this late date, I have thought it best to follow Becker's recent work and retain *Trineura*.

EXPLANATION OF PLATES.

PLATE V.

Figure 1. *Phora pachyneura* Lw. Wing.
" 2. *Phora pachyneura* Lw. Hypopygium of male.
" 3. *Phora fratercula* sp. nov. Wing.
" 4. *Phora thoracia* Meig. Wing.
" 5. *Phora spinipes* Coq. Wing.
" 6. *Phora spinipes* Coq. Hind tibia.
" 7. *Phora olympiæ* sp. nov.
" 8. *Phora scutellata* sp. nov.
" 9. *Phora multiseriata* sp. nov. Wing.
" 10. *Phora multiseriata*. Hind leg.
" 11. *Phora scutellata* sp. nov. Hind leg.
" 12. *Phora comstocki* sp. nov. Wing.
" 13. *Phora luggeri* Ald. Wing.

PLATE VI.

" 14. *Phora nitidifrons* sp. nov.
" 15. *Phora cimbicis* Ald. Wing.
" 16. *Phora incisuralis* Lw. Wing.
" 17. *Phora grœnlandica* Lund. Wing. (After Lundbeck.)
" 18. *Hypocera johnsoni* sp. nov. Wing.
" 19. *Hypocera johnsoni*. Head seen from the front.
" 20. *Hypocera ehrmanni* sp. nov. Wing.
" 21. *Hypocera femorata* Meig. Wing.
" 22. *Hypocera clavata* Lw. Hind leg.
" 23. *Hypocera clavata*. Wing.
" 24. *Hypocera grenadensis* sp. nov. Wing.
" 25. *Aphiochæta epiræ* Brues. Wing.
" 26. *Aphiochæta pygmæa* Zett. Wing.
" 27. *Aphiochæta obscusra* p. nov. Wing.

PLATE VII.

Fig. 28. *Aphiochæta picta* Lehm. Wing.
" 29. *Aphiochæta flava* Fall. Wing.
" 30. *Aphiochæta atlantica* sp. nov. Front.
" 31. *Aphiochæta lutea* Meig. Wing.
" 32. *Aphiochæta fungicola* Coq. Wing.
" 33. *Aphiochæta scalaris* Lw. Wing.
" 34. *Aphiochæt anigriceps* Lw. Wing.
" 35. *Aphiochæta aurea* Ald. Wing.
" 36. *Aphiochæta magnipalpis* Ald. Wing.
" 37. *Aphiochæta halictorum* M. et B. Wing.
" 38. *Aphiochæta minuta* Ald. Wings.
" 39. *Aphiochæta furtiva* Ald. Wing.
" 40. *Aphiochæta rufipes* Meig. Wing.

PLATE VIII.

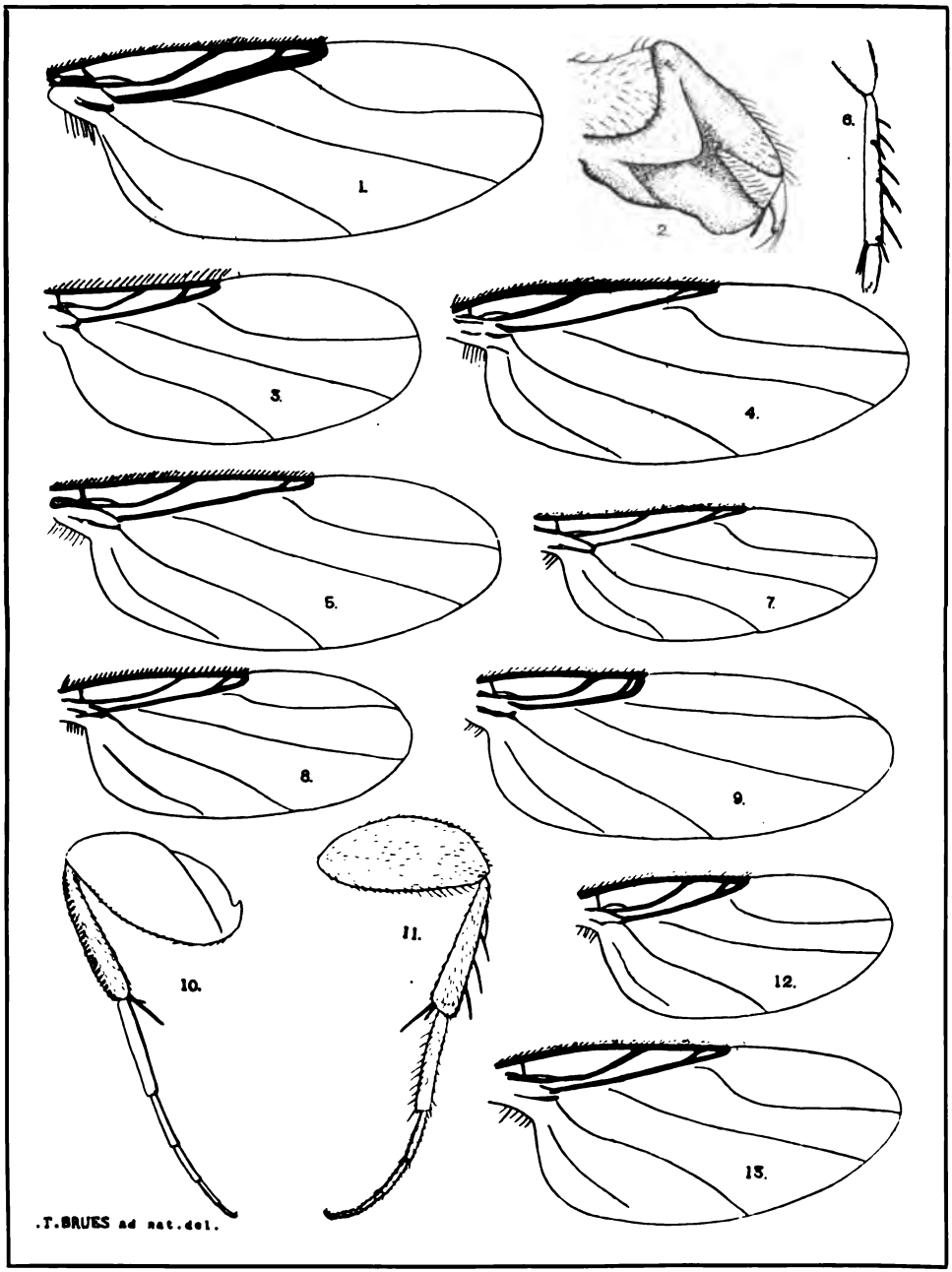
" 41. *Aphiochæta agarici* Lint. Wing.
" 42. *Aphiochæta setacea* Ald. Wing.
" 43. *Aphiochæta rostrata* M. et B. Head viewed from the side.
" 44. *Aphiochæta rostrata.* Wing.
" 45. *Aphiochæta pulicaria* Fall. Wing.
" 46. ? *Aphiochæta* sp. innom. Tip of middle leg of male.
" 47. *Apocephalus pergandei.* Wing.
" 48. *Apocephalus pergandei.* Ovipositor of female, dorsal view.
" 49. *Apocephalus wheeleri* sp. nov. Ovipositor of female, dorsal view.
" 50. *Trineura aterrima* Fabr. Wing.
" 51. *Trineura velutina* Meig. Wing.
" 52. *Trineura montana.* sp. nov. Wing.
" 53. *Trineura montana.* Front leg of male.
" 54. *Conicera aldrichii* sp. nov. Wing.
" 55. *Conicera atra* Meig. Wing.
" 56. *Conicera atra* Meig. Antenna.

PLATE IX.

" 57. *Gymnophora arcuata* Meig. Wing.
" 58. *Pachyneurella venata* Ald. Wing.
" 59. *Pachyneurella venata.* Hypopygium of male.
" 60. *Melanloncha pulchella* gen. et sp. nov. Female.

ERRATA.

Page 336, penultimate line, read *dead* instead of *head of.*
Page 357, the table of species is for the genus *Aphiochæta.*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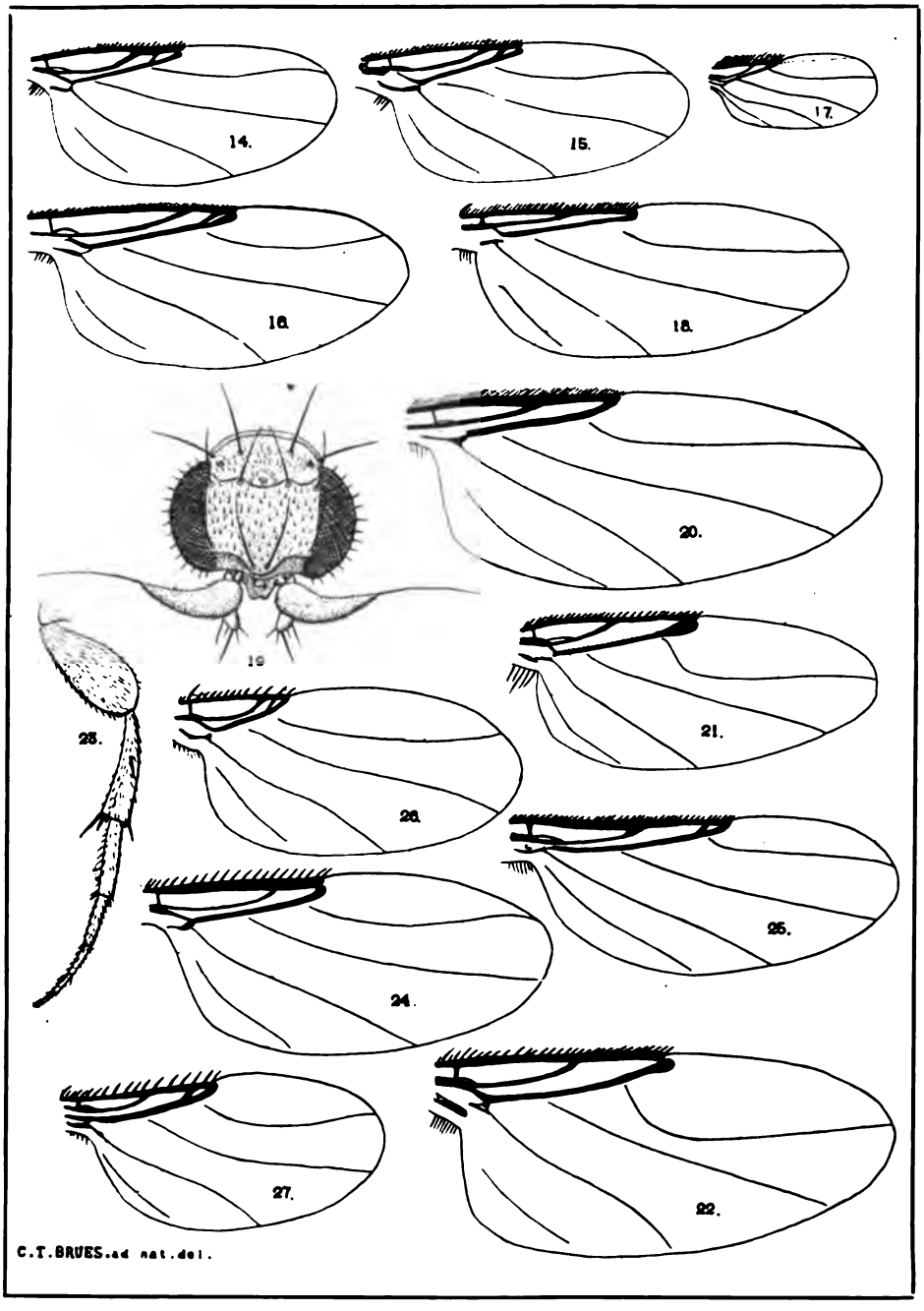
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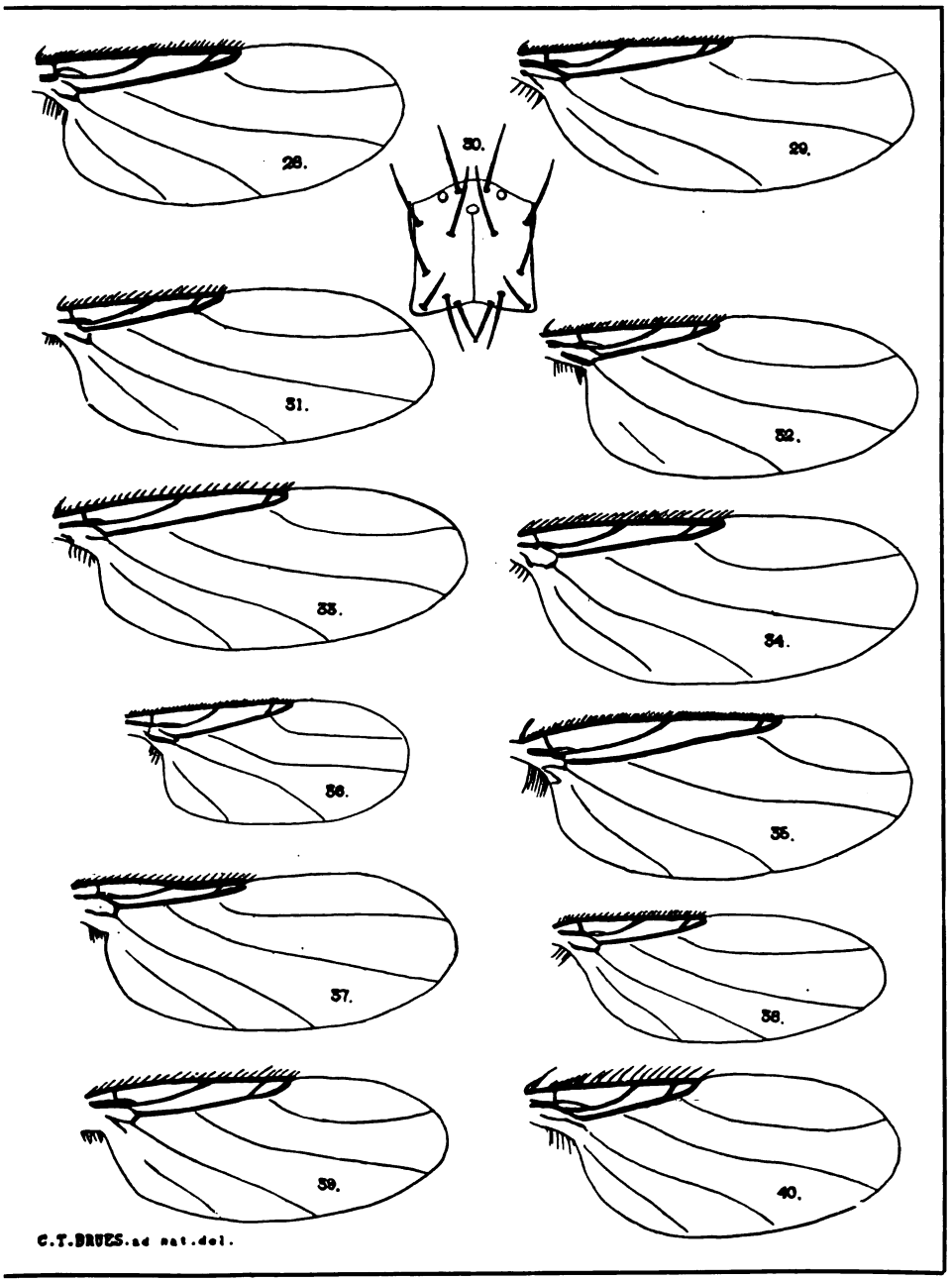
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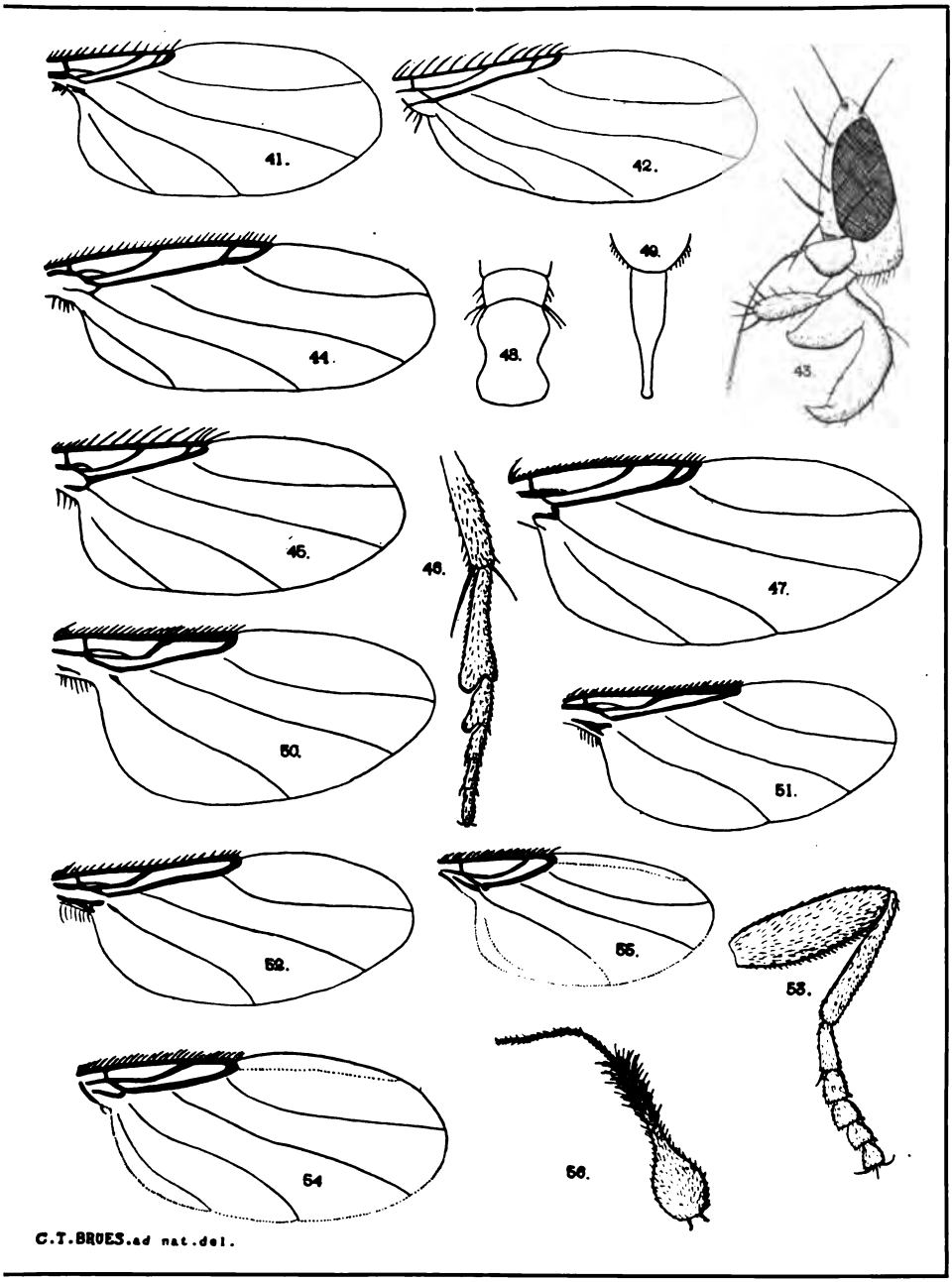
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